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WEED ABSTRACTS

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NOTES FOR READERS

Weed Abstracts endeavours to provide a comprehensive coverage of the world's literature on weeds, weed control and closely allied subjects. To this end, over 370 journals and nearly 100 annual reports are regularly searched. Other journals, reports, bulletins, etc. are abstracted as they are seen. Additional coverage is obtained through agreements with other abstracting organizations.

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As far as possible the journal abbreviations used are those given in the World List of Scientific Periodicals. Holding library symbols are also taken from the World List, e.g. O.BO = Botany Department, Oxford. Numbers at the end of abstracts, e.g. 75(492) are for internal use only.

When a paper is by more than one author, the address of the first author only is given.

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The Information Section is always pleased to receive comments and suggestions for the improvement of Weed Abstracts.

* An asterisk before the author's name indicates that only the title of the paper has been seen.

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ac	- acre(s)	in.	- inch(es)	p.s.i.	- pounds per square in.
a.e.	- acid equivalent	kg	- kilogram(s)	v/v	- volume/volume
a.i.	- active ingredient	l	- litre(s)	w/v	- weight/volume
cm	- centimetre(s)	lb	- pound(s)	w/w	- weight/weight
d.b.h.	- diameter at breast height	m	- metre(s)	>	- greater than
ft	- foot(feet)	ml	- millilitre(s)	<	- less than
g	- gram(s)	oz	- ounce(s)	#	- pounds per acre
gal	- gallon(s)	post-em.	- post-emergence	±	- with or without
ha	- hectare(s)	pre-em.	- pre-emergence		
		p.p.m.	- parts per million		

Language abbreviations: an initial capital denotes the language of the article, a small letter that of the summary: - Dan. - Danish, Du. - Dutch, E. - English, F. - French, G. - German, It. - Italian, Jap. - Japanese, Nor. - Norwegian, Russ. - Russian, Span. - Spanish, Sw. - Swedish.

1358. FRANS, R.E. (Arkansas Agric.Exp. Sta.,Fayetteville,U.S.A.). Pre-planting herbicides for controlling Johnsongrass in field crops. Proc.14th Southern Weed Conf., 1961, 37-43, tabs.6,bibl.3.
In trials in Arkansas on Sharkey clay (gumbo), and Sharkey loamy sand, soybeans were treated in 1959 with dalapon 10 # 2 or 4 weeks before sowing, or with EPTC at 2 weeks before sowing; pre-em. treatments with naptalam-sodium, EPTC and CDAA each at 4 # were superimposed on the pre-sowing treatments. In 1960, cotton, maize, soybeans and grain sorghum were sown 0, 1, 3, 4 or 5 weeks after pre-sowing treatment with EPTC 4 # or dalapon 10 #. In both years, pre-sowing treatment with EPTC and dalapon satisfactorily controlled Sorghum halepense and did not differ significantly in effectiveness in either year. There were no significant interactions between the pre-sowing and pre-em. treatments in 1959. In the 1960 trials, cotton stands were reduced on both soils by EPTC applied 0 or 1 week before sowing, while dalapon had no effect. Maize stands were severely injured by dalapon applied on the day of sowing, while EPTC had no apparent effect. With sorghum, EPTC applied 0, 1 or 3 weeks before sowing on both soils and dalapon applied at the time of sowing on the loamy sand soil severely reduced stands. Soybean stands were little affected by any treatment and EPTC increased yields compared with controls on both soils. It was concluded that maize, soybeans and cotton were sufficiently tolerant to either herbicide to enable it to be used for S. halepense control, where 2-3 weeks were allowed to elapse between treatment and sowing. - P.J.B. [O.W.]

1359. BECKER, A. (PflSchAmt.,Bad Godesberg,Germany). Hat die Wuchsstoffbehandlung zur Unkrautbekämpfung im Getreide Einfluss auf den Saatgutwert? [Has growth regulator treatment for weed control in cereal crops an influence upon seed quality?] Gesunde Pflanze, 1961, 13, (4),108-11, figs.2,tabs.1,bibl.4.
The results of trials in 1960, in which winter wheat, rye and oats were treated with MCPA, are discussed, with particular reference to different types of ear deformities. There was no evidence of any abnormalities in plants grown from seed harvested from ears showing deformities. - J.L.M. [O.W.]

1360. KÜTHE, K. (PflSchAmt.,Bezirksstelle, Giessen,Germany). Neue Möglichkeiten der Unkrautbekämpfung in Mais. [New possibilities for weed control in maize.] Gesunde Pflanze, 1961, 13,(4),100-7, tabs.3,bibl.2.
In trials in 1960 in which simazine and atrazine pre-em., and atrazine and MCPA ester post-em. were applied to maize, both simazine and atrazine 1.5 kg/ha pre-em. resulted in weed-free stands, but at post-em. (where maize was at the 3-to 4-leaf stage and weeds were emerging) atrazine 4 kg/ha resulted both in weed-free stand and a yield 8% higher than that obtained with the pre-em. treatment. J.L.M. [O.W.]

1361. SIMON, W. Über Bedeutung und practischen Einsatz einer"Maisbandspritze". [Concerning the significance and practical application of a maize band sprayer.] Dtsche Agrartechnik, 1961, 11,(3),116-9.
To overcome a shortage of band sprayers in East Germany, an improvised spraying apparatus mounted on a widely-used type of seed drill is described. The results of band-spraying trials in 1960 showed that economies in working time could be made by applying fertilizer (in this case urea) together with the herbicide at sowing. The solubility of simazine was unaffected by urea solution, and its herbicidal effectiveness appeared to be improved. A maize yield of 410 deciton/ha was obtained with nitrochalk applied before sowing and simazine 1.5 kg/ha in 300 l water applied as a band spray at sowing. With urea at 86 and 129 kg/ha (corresponding to 40 and 60 kg/ha nitrogen) + simazine 1.5 kg/ha, in 300-400 l solution applied as a band spray at sowing, a maize yield of 460 deciton/ha was obtained. In both cases the weed stand at harvest time was $<2\%$ compared with 34% on the control plots. Where weed infestation was heavy, simazine applied overall at 4.5 and in bands at 1.5 kg/ha gave poor control of weeds; satisfactory control was given by 7.5 kg overall and 2.5 kg in bands. - J.L.M. [285(43)]

1362. QUAGLIA, A. (Univ.Inst.Patol.Veg., Bologna,Italy). Influenza sul potere germinativo dei semi e persistenza nel terreno di alcuni erbicidi. [The influence of some herbicides on the germination and persistence in the soil of seeds.] Ann. Sper.Agrar., 1960, 14,(3),369-83, figs.7, tabs.4,bibl.25.
The effects of monuron, neburon, chlorpropham and 2,4-DES, applied at 2 rates on the day of sowing and 20, 40 and 60 days later, on the germination and subsequent growth or mortality of maize var. Cinquentino di Castelfranco are described and tabulated.

The following general conclusions were drawn: chlorpropham had the greatest inhibitory effect on germination; the other compounds showed a greater effect on germinative energy and subsequent growth than on % of germination. For all compounds except chlorpropham the greatest effect on germination was from applications made 20 days before sowing. The initial effect of the herbicides, in order of intensity, showed itself in post-germination mortality, reduction in germination % and germinative energy. Of these, the effect on germination was the most reduced by time, followed by a reduction in mortality; the effects on germinative energy and on growth declined more gradually with time. - D.M.L.S. [77(45)]

1363. - NAIDU, B.A. and SINGH, D.J.C. [Div.Bot.,Agric.Coll.,Bapatla,India). Studies on the effects of certain chlorophenoxy compounds on rice crop (Oryza sativa L.) and weeds. Andhra Agric.J., 1961, 8, (1),1-9, tabs.4,bibl.9.

Data are given of weed control and yield in rice during trials in 1956-9, in which Fernoxone (2,4-D sodium 80%) 10, 15 and 20 #, Hedonal (M) (MCPA) and Tributon (esters of 2,4-D+ 2,4,5-T) 1.0, 1.5 and 2.0 gal/ac, were applied in 100 gal spray/ac one month before or after rice seedlings were transplanted. All pre-planting treatments increased yield (Fernoxone 10 # gave the highest yield) and all post-planting treatments reduced yields, as compared both with untreated and with hand-weeded plots. Malformations occurred following post-planting treatments. Weeds in these trials were Cyperus rotundus, Echinochloa crusgalli, Eragrostis willdenoviana, Cynodon dactylon, Chloris barbata, Oldenlandia biflora, Lippia nodiflora, Alternanthera sessilis and Croton sparsiflorus. - M.G.G. [27(54)]

1364. VEGA, M.R. and OBIEN, S.R. (Central Experiment Sta.,Philippines). The response of some lowland rice varieties to 2,4-dichlorophenoxyacetic acid (2,4-D). Philippine Agr., 1960, 44,(1),45-65, figs.8,tabs.8,bibl.5.

The recommended rice varieties B-E-3, Intan, Peta, Tjahaja, and Tjere Mas, were sprayed in the glass house with 2,4-D at 0.84 kg or 1.40 kg in 37 gal spray/ha, (a) 40 days or (b) 20 days after germination. Milfor 6 and Raminad were sprayed at the same rates 20 days after germination. Plant growth was temporarily retarded immediately after spraying in all varieties receiving treatment (b), and in Peta, Tjahaja, Tjere Mas and Intan at 1.4 kg/ha, for treatment (b). Growth was retarded after 5 days in Intan at 0.84 kg/ha and in B-E-3 at 1.4 kg/ha and after 10 days in B-E-3 at 0.84 kg/ha. Recovery after treatment (a) took 11-21 days for all varieties; with (b) all varieties had recovered after 21 days, except B-E-3, which took 7 days and Peta which took 28 days after treatment with 0.84 kg/ha and was killed where 1.4 kg/ha was applied. The final height of treated plants ranged from 6.25 cm shorter than the control in Intan to 7.25 cm taller in Tjahaja for treatment (a), and 14 cm shorter than the control in Intan to 5.75 cm taller in Raminad. Tiller production was reduced with (b) but had resumed in all varieties after 30 days. All varieties showed similar morphological defects. With treatment (a), flowering of Intan was delayed 4 days at 0.84 kg/ha and 12 days at 1.4 kg/ha. It was hastened by 1 to 2 days in Tjere Mas at 1.4 kg/ha, and in Tjahaja and Peta both rates. Tjere Mas at 0.84 kg/ha and B-E-3, a photoperiodic variety were unaffected. With treatment (b), flowering was delayed 2 days in B-E-3 and 6 days in Milfor, for 6 days in Intan and Peta at 0.84 kg/ha, and 9 days in Intan at 1.4 kg/ha. Flowering in Tjahaja and Tjere Mas was delayed at 0.84 kg/ha and hastened at 1.4 kg/ha. Raminad was unaffected. However, yield (in terms of weight of filled grain/plant) was not reduced in any variety. It was concluded that where recommended rates and dates of spraying were used, the variety was not of importance in determining the success of treatment. Where early spraying, using high concentrations of 2,4-D was required, it was recommended that B-E-3 should be employed and Peta avoided. - M.G.G. [59(931)]

1365. *ANDREEVA-FETVADZHIEVA, N. Die Anwendung von herbizid 2,4-D bei der Reiskultur vor der Aussaat. [The application of 2,4-D to rice crops before sowing.] Vissh.Selskostopanki Inst."Georgi Dimitrov". Agron.Fakul.Nauch.Trudove 1959, 7,323-44, (Bulgarian,g.).

1366. BORZINI, G. (Plant Protection Service,Turin,Italy). Results of field experiments for the control of plant diseases and pests carried out in Piedmont, Italy, during 1960. Agric.Aviation, 1961, 3,(3),82-5, figs.1.

Satisfactory control of rice weeds (including Panicum spp., Alisma plantago-aquatica and Scirpus mucronatus) was obtained using a Djinn helicopter to spray MCPA 2 kg/ha in

30 l solution. A high water level in the crop during treatment is recommended to minimize the possibility of crop injury. No phytotoxic action was seen on poplars bordering the rice fields, but willows were severely damaged. - J.W.F. [O.RE.]

1367. HUBERT, K. (Biol.ZentAnst.,Halle, Germany). Bei der Unkrautbekämpfung im Mais alle Möglichkeiten nutzen. [Using all possibilities in the control of weeds in maize.] Deutsche Agrartechnik, 1961, 11,(3),113-5, figs.6,tabs.1,bibl.5.
Recommendations are given for the use of herbicides on maize in 1961 in East Germany, with a review of the results of chemical control methods used in 1960, when seed drill mounted sprayers were used on 30.4% of the total area of maize treated with herbicides. It was thought that spray nozzles were more effective when mounted between the press wheels of the seed drill where they were able to follow closely any unevenness of the soil surface. A trailer-mounted sprayer towed behind the seed drill and connected by a flexible pipe to the spray boom mounted on the drill, was used successfully. - J.L.M. [284(43)]

1368. THOMPSON, W.R., ANDERSON, K.L. and McVEY, J.L. Weed control in pastures, in sorghum, in corn: sprayers to use. Mississippi State Univ.Agric.Ext.P., 1960, 403,pp.12.
Gives rates for dinoseb, simazine and diuron pre-em. and 2,4-D post-em. in maize, and simazine pre-em. and 2,4-D post-em. in sorghum, also recommendations for controlling common Mississippi pasture weeds. - D.M.L.S. [47(76.2)]

1369. MOOLANI, M.K. (Univ.Illinois, Urbana,U.S.A.). The competitive effects of various intensities of Amaranthus hybridus L. on the development and yield of corn and soybeans. Ph.D.Thesis, Illinois Univ., 1961, pp.103, Microfilm $2.75, Xerox $5.20.
The results are given of two field trials in which weed stands of Amaranthus hybridus were established in maize and soybeans. In the first trial, the A. hybridus was allowed to grow to maturity and the growth and yield of the two crops were recorded. The A. hybridus was established in the crop rows in bands 4-6 in. wide, with A. hybridus plants spaced 1, 5, 10, 20 and 40 in. apart. In the second trial, in which time of weed removal was studied, uniform stands of A. hybridus were established (one plant every 1 in.) and removed at 3-week intervals. The results of the first trial showed that crop yield reduction was proportionate to A. hybridus density. If A. hybridus grew for the entire season, maize yields were reduced by 40% and soybean yields by 65%. The reduction in soybean yield was partly due to the effect of A. hybridus in shading the crop. Dry weight of maize + A. hybridus was about equal to that of weed-free maize, but dry weight of soybeans + A. hybridus was about 1.5 times that of weed-free soybeans. The results of the second trial indicated that the time of A. hybridus removal had a significant influence on maize and soybean yields. In maize, the greatest reduction (12%) occurred when weeds were allowed to grow for 8-10 weeks. In soybeans, yield reductions were >50% where A. hybridus was allowed to grow for 10-12 weeks. From Diss. Abstr.21,(11),3219. - J.W.F.

1370. BONDARENKO, D.D. (Ohio Agric.Exp. Sta.,Wooster,U.S.A.). Herbicides recommended for weed control on corn and soybeans. Ohio Fm Home Res., 1961,46,(3),36-7,47, figs.3.
Recommendations are given, based on the results of field trials in 1960. In trials with soybeans, best weed control was obtained with amiben + chlorpropham 2 #, applied pre-em., though chlorpropham 2 # + naptalam 2 # applied pre-em. has given particularly good control of annual weeds, including Polygonum sp., Amaranthus sp. and Ambrosia sp. J.L.M. [O.W.]

1371. GREAT BRITAIN, MINISTRY OF AGRICULTURE, FISHERIES AND FOOD. Weed control in peas. Adv.Leafl.Min.Agric.Lond., 1961, 376, pp.6, tabs.2.
The following recommendations are given: (1) Post-em. Dinoseb (ammonium) 1-1.5 # in at least 50 gal water (not before peas have 3 expanded leaves); dinoseb (amine) 1.5-2.5 # in not less than 30 gal/ac (from 1st expanded leaf stage until 10 in. high); MCPB up to 2 # in 10-20 gal water (from 3rd-6th expanded leaf stage). (2) Pre-sowing for wild oat (Avena fatua) control. TCA up to 7 # in at least 20 gal water (not less than 3 weeks before sowing and incorporated into the seedbed); propham 3 # in 20 gal water at least 4 days before sowing and incorporated immediately after spraying. (3) Pre-em. (except on sandy or silt soils). Chlorpropham 1 # + diuron or fenuron 0.25 #. PCP, sulphuric acid and dinoseb pre-em.

are of limited value. Tables are included giving the susceptibility of 16 annual weeds to dinoseb and MCPB and of 5 perennial weeds to MCPB. - D.M.L.S. [474(42)]

1372. STÖHR. Pflanzenschutzmassnahmen im Rübenbau unter besonderer Berücksichtigung kurhessischer Verhältnisse. [Plant protection measures in root crops with special reference to conditions in the Hesse district.] Gesunde Pflanze, 1961, 13,(9), 214-7.
Recommends the application of sodium nitrate 3-4 dz/ha in 800-1000 l water at low pressure to beet at the 4-leaf stage for the control of Sinapis arvensis, Raphanus raphanistrum, Polygonum sp. Galeopsis ladanum and Thlaspi arvense. J.L.M. [O.W.]

1373. BURTCH, L.M. (Spreckels Sugar Co., Fresno,California,U.S.A.). Weed control measures for sugarbeet crop. Crops and Soils, 1961, 13,(8),26.
The pre-em. use of TCA, endothal, and EPTC for weed control in sugarbeets in California is briefly reviewed. Though granular EPTC was about twice as effective in controlling weeds as endothal, its margin of crop safety was narrow. Dalapon post-em. has been successful in holding young volunteer grain and grasses in check under wet soil conditions until mechanical and hand control methods can be used. - J.L.M. [O.W.]

1374. HOLSTUN, J.T., McWHORTER, C.G. and WOOTEN, O.B. (Mississippi Agric.Exp.Sta., Stoneville,U.S.A.). Preplanting EPTC for weed control in cotton. Proc.14th Southern Weed Conf., 1961, 44-5, (Abstract).
In trials in Mississippi with EPTC used pre-sowing to control Sorghum halepense, annual grasses and Cyperus spp., non-incorporated applications were inconsistent in effectiveness against weeds and cotton did not tolerate rates sufficient to give good weed control. EPTC 5-15 # incorporated gave good control of these weeds and was tolerated by cotton when sown 2-3 weeks later. Application of EPTC with a sub-surface applicator gave good control of Cyperus spp. at rates as low as 2 #. Preliminary observations indicated that cotton sown immediately after applying EPTC at 1-2 # would tolerate these rates when sown not more than 1 in. above the treated soil layer. Control of annual weeds with sub-surface applications of EPTC has been good. - P.J.B. [O.W.]

1375. HOLSTUN, J.T. and McWHORTER, C.G. (Mississippi Agric.Exp.Sta.,Stoneville, U.S.A.). Replanting cotton treated pre-emergence with diuron. Proc.14th Southern Weed Conf., 1961, 46-7, (Abstract).
A summary is given of the results of trials in which cotton was resown (after failure of the first sowing) after different methods of seedbed tillage (discing, re-listing, cultivation and no cultivation) of soil previously treated with diuron. The resown cotton was also treated pre-em. with diuron. It was concluded that any methods of seedbed preparation for cotton sown in soil previously treated with diuron should ensure that the seed is placed in untreated soil below the treated layers, or in treated soil mixed thoroughly with untreated soil. Treatment of resown cotton with diuron tended to increase any symptoms of injury caused by sowing in soil previously treated with diuron and average yields of retreated, resown plots were slightly lower than those on which only the resown crop received diuron treatment. It was believed that the retreatment of resown cotton was not economically profitable. - P.J.B. [O.W.]

1376. THOMPSON, J.T. (Georgia Agric. Exp.Sta.,Experiment,U.S.A.). Weed control activity of Dicryl enhanced in mixture. Proc.14th Southern Weed Conf., 1961, 48-9, (Abstract).
In 7 trials in 1960 at 3 locations in Georgia, very good to excellent control of weeds was given by Dicryl (N-(3,4-dichlorophenyl) methacrylamide + DMA (disodium methylarsonate-anhydrous) applied post-em. as early and lay-by treatments to cotton, post-em. in Bermuda grass turf and post-em. lay-by treatments to bell pepper (Capsicum frutescens). The principal weeds controlled were Digitaria sanguinalis, Eleusine indica, Cyperus esculentus, Paspalum dilatatum, Amaranthus retroflexus, Cassia tora, Ipomoea purpurea and Richardia scabra. Sida spinosa was not eradicated by the rates used. Rates of Dicryl 0.5 # + DMA 1 # (overall basis) were effective against mixed weeds <3 in. tall. Dicryl 0.75 - 1 # + DMA 1-3 # gave good kill of mixed weeds up to 10 in. tall. No crop yield reductions were noted after any treatment. P.J.B. [O.W.]

1377. SMILIE, J.L. and THOMAS, C.H. (Univ.Louisiana,Baton Rouge,U.S.A.). Discussion of "evaluating flame-burner design for weed control in cotton".

Trans.Amer.Soc.Agric.Eng., 1960, 3,(2), 127-8, tabs.1.
Experiments were carried out to test the effectiveness of the two best flame patterns, as determined from trials with the Arkansas, Stoneville, Agri-Quip, and modified Agri-Quip burners. Trial cotton plots were treated with herbicide pre-em., and were flamed after later weed emergence by the Arkansas, Agri-Quip, and modified Agri-Quip burners, at settings of 22.5° and 45° from the horizontal. The 45° setting at 40 lb pressure, 8-10 in. from the ground, with a row offset of 2 in. at a tractor speed of 3 m.p.h., was found to give the best weed control with both vapour and liquid burners. - J.L.M. [222(79.4)]

1378. van KEUREN, R.W., BRUNS, V.F. and SUGGS, D.D. Forages for grazing and weed control in wet areas of the Columbia basin. Sta.Circ.Wash.Agr.Expt.Sta., 1960, 374, pp.12, figs.9.
A progress report on the establishment of grass and clover in the Columbia Basin area, with brief notes on the species of grasses and clovers used and methods for controlling weeds in the resown areas. J.L.M. [51(79.7)]

1379. McCONNEL, A.L. Medusa-head wildrye continues to spread. Crops and Soils, 1961, 13,(8),26-7.
The botanical features of medusa-head wildrye (Elymus caput-medusae), prevalent on ranges in Idaho, California, Oregon, and Washington, are briefly reviewed. The plant is strongly competitive, often completely invading an area, growing so thickly that a layer of litter 4 in. deep is deposited on the soil surface. E. caput-medusae is not palatable, but when given heavy nitrogen applications, it may be grazed, though not sufficiently to be controlled by cattle. Silage made from the grass was of poor quality and was rejected by livestock. - J.L.M. [O.W.]

1380. RICHTER, W. Erfahrungen bei der Bekämpfung des Sauerampfers (Rumex acetosa L.) mit 2,4-D-und-MCPA-Wuchsstoffen. [Experiences in the control of sorrel (R. acetosa L.) with 2,4-D and MCPA growth regulators.] Praxis u.Forsch., 1960, 12, (7),170-1.
In trials in 1953-55 on acidic, marshy lowlands near Oldenburg with swards containing 30% Rumex acetosa and smaller proportions of Caltha palustris, Ranunculus repens, Carex spp. and grasses, 2,4-D sodium, 2,4-D amine, MCPA, 2,4-D ester, and 2,4-D + 2,4,5-T mixture were applied when the R. acetosa was in bud. Stands of R. acetosa were reduced by 85% in 4 weeks, a second application 4 weeks after the first reduced stands by 91-99% within 6 weeks. Of the treatments, 2,4-D (sodium) 0.25% [a.i. not stated] and 2,4-D + 2,4,5-T 5 l/ha [presumably a.i.; a.e. not stated] were the most effective. In the autumn of the year after treatment, R. acetosa stands had regenerated to the original level on all treated plots. - J.L.M. [290(43)]

1381. LEONARD, W.F. (Dep.Agric.Christchurch, New Zealand). Nassella tussock control. N.Z.J.Agric., 1961, 102,(5),425-9, figs.3.
Control of nassella tussock [Nassella trichotoma] was most effective if carried out in the driest months, when dalapon 10 # gave a 100% kill; rates of > 80 # were required for complete control in July and August, normally wet months. TCA 120 # was equal to dalapon 30 # in effect. For scattered plants, dalapon powder (% a.e. not stated) at 1 oz/20-40 plants was effective in dry weather, but not in winter. There was no evidence of residual toxicity from dalapon, and oversowing immediately after treatment was permissible. It was necessary to carry out oversowing within 6 months of spraying to avoid regeneration of nassella. J.L.M. [O.W.]

1382. MEYER, J. Einfluss der Mahol auf den Erfolg einer Wuchsstoffbehandlung bei Binsen. [Influence of mowing on the success of a growth regulator application on rushes.] Gesunde Pflanze, 1961, 13,(9),207-12, figs.3, tabs.1.
In recent trials in Oldenburg in which stands of rushes (Juncus effusus) 70 cm high and interspersed Carex spp. were mown 5-35 days after applications of MCPA 1200 g a.i./ha, J. effusus was almost completely eradicated. MCPA applied directly after mowing had a regenerative effect on J. effusus, 22.7% and 8.5% of the tufts mown to a height of 10 cm recovering after applications of MCPA 720 g a.i./ha and 1440 g a.i./ha, respectively. J. effusus stands 10 cm and 70 cm high showed a 27.9% and 0.18% recovery, respectively after treatment with low rates of MCPA amine (480 g a.e./ha). - J.L.M. [O.W.]

1383. MURPHY, J.P. Weed control in irrigated pastures. J.Dep.Agric.,Vict.,

1961, 59,(8),416-7, figs.3.
For controlling rushes (Juncus spp.) in irrigated pastures, mowing before flowering for several years, or late-winter spraying with 2,4-D ester 2 # in 10 gal water, followed by mowing 6-8 days later, is effective. With umbrella sedge (Carex sp.), good control has been obtained by spraying with 2,4-D ester 2 # in early December. For controlling Rumex spp., good results have been obtained by rotary hoeing to a depth of at least 4 in. in autumn, followed by sowing a cereal crop and spraying it in August with MCPA 1 # or 2,4-D amine 0.5 # in 10 gal water. Seed-setting in Rumex spp. can be prevented in pastures closed for hay by applying MCPA 0.75 # just as the tops of the Rumex spp. appear above the grass.
P.J.B. [O.W.]

1384. TAYLOR, R.J. Renovation is the answer to run-down pastures. J.Dep.Agric. S.Aust., 1961, 64,(12),510-21, figs.10.
Recommendations are given for the renovation of pastures which have declined as a result of the lack of grass and weed infestation. On non-arable land (too steep or stony to till, or liable to erode) the pasture should first be grazed hard to remove top growth, then oversown (with a disc drill) before the rains in early- to mid-April, preferably with Lolium perenne, together with the application of superphosphate. Where 2,4-D is used the pasture should be left for 4-5 weeks to permit weeds to germinate, then sprayed with 2,4-D 0.5 #, grazed and then oversown as before. On weed-dominated, poor arable land, weed competition can be reduced by growing one or preferably two short-term cereal or fodder crops, then sowing perennial grasses and clover in autumn or perennial grasses in spring, with clover oversown in the autumn. A shorter, but more risky method, is to sow grass either with the cereals in the autumn, 3 to 4 weeks after the rains, or with a fodder crop in early spring. Grazing should not commence until the pasture is established. If weeds threaten to choke the grass, hard grazing is recommended. Cutting should be early, before weeds set seed. - M.G.G. [O.W.]

1385. ZIEGENBEIN, G. Staatlichen Lehr- und Versuchsanstalt für Grunlandwirtsch.u. Futterbau Eichhof,Bad Hersfeld,W.Germany. Versuche zur Erntebeschleunigung mit chemischen Mitteln-Blattvorwelke - im Samenbau von Weissklee, Rotklee und Luzerne. [Trials on the speeding-up of harvest with chemicals - pre-harvest desiccation - in white clover, red clover and lucerne for seed.] Saatgut-Wirtsch., 1961, 13,(5), 139-41.
The results are given of trials in the wet year of 1960 with DNOC, dinoseb, sodium monochloroacetate, PCP, sulphuric acid, endothal and diquat dibromide for the pre-harvest desiccation of red clover, white clover and lucerne. In trials with white clover, treatments were made to relatively green, lush crops on 3 August in 200 l spray. Diquat dibromide at 1 l/ha (a.i. not stated) gave the best results, followed by endothal 10 l, DNOC 4 kg and dinoseb 7 l. In no case was desiccation complete in the very dense crop. In a further trial in which the spray volume was increased to 500 l so as to improve penetration, endothal gave satisfactory results, while diquat dibromide and sodium monochloroacetate were less effective than with the 200 l spray volume. Where the rates of herbicide were doubled, in combination with a spray volume of 500 l, endothal again gave the best results. Applied at 2 l/ha, diquat dibromide in 500 l spray was more effective than in 200 l spray. With red clover (fairly open stand),DNOC 5 or 10 kg/ha and dinoseb 7 or 14 l were very effective. Good results were also obtained with endothal 12 and 24 l/ha and diquat dibromide 1 and 3 l, especially at the higher rates. With lucerne, DNOC 5 and 10 kg/ha and diquat dibromide 1 and 3 l, sodium monochloroacetate 40 kg and endothal 24 l were effective. The appearance and germination capacity of seed from treated plants was not effected, thought treatment with endothal in some cases caused a transient reduction in germination %.
P.J.B.

1386. ALLEY, H.P., FABRICIUS, L.J. and SONDER, L.E. Effects of big-sagebrush control upon the density, composition and production of native forage species, soil moisture percentage and snow cover. Mimeo. Circ.Wyoming agric.Exp.Sta., 1958. 114, 29-34, tabs.3.
Includes a summary of the vegetation changes in an area of range typical of the low-growing form of big sagebrush (Artemisia tridentata), in the Red Desert of S. central Wyoming, one year after treatment with 2,4-D butyl or propylene glycol butyl ether ester 2 # ± wetting agent in 2 gal diesel oil in May, 1957. Ground cover of A. tridentata decreased from 25.4% to 16.5%. Semi-shrubs and forbs which had a density of 7.3% in 1957, decreased to 3.9%. An increase of > 100%

was recorded for grass and grass-like species (14.1 to 33.2%), due mostly to increases in Agropyron dasystachyum (5.4 to 12.5%) and Koeleria cristata (1.2 to 13.4%). As a result of the increase in grass, % of bare ground decreased from 53.2% to 46.4%. Air-dry forage yields of sprayed plots averaged 190 # in 1958, compared with 98 # from untreated plots. - M.G.G. [29(78.7)]

1387. CROP PROTECTION COURIER. (Farbenfabriken Bayer Ag., Leverkusen-Bayerwerk, W. Germany). Jungle transformed into pastureland. Crop Protect. Cour., 1961, 1, (3), 1.
An account is given of the reclamation of a pasture within 3 months, after 5 years growth of tropical forest scrub, by aerial spraying in February with Tributon (2,4-D + 2,4,5-T) in a diesel oil/water carrier. - M.G.G. [295(43)]

HORTICULTURAL, ORNAMENTAL AND PLANTATION CROPS

See also 1376

1388. GREAT BRITAIN, MINISTRY OF AGRICULTURE, FISHERIES AND FOOD. Onions and related crops. Bull. Minist. Agric. Fish., Fd, 1956, 69, pp. 30, figs. 8.
For control of weeds in onions, hand hoeing, use of flame gun, mechanical methods and spraying with H_2SO_4 are recommended. As a pre-em. treatment H_2SO_4 should be used at 13 gal acid/100 gal solution + wetting agent. The solution should be applied post-em. when the onions have just passed the crook or loop stage, and preferably when the first leaves of the weeds are emerging. The strength of solution depends on the weed species; Solanum nigrum and Sinapis arvensis require 7 to 9 gal acid/100 gal solution, Stellaria media, Urtica urens and Chenopodium album 10 to 13 gal, Sonchus spp. and Matricaria spp. 10 gal + wetting agent. Rumex spp. and Cirsium spp., perennial grasses such as Agropyron repens and annual grasses such as Poa annua are not killed by these concentrations. The spray volume varies with the size and species of weed and the type of sprayer, for example, Chenopodium album which must be sprayed when small, requires 120 gal/ac, while Sinapis arvensis, which may be left until the 4-leaf stage, requires 100 gal/ac. Precautions necessary when using H_2SO_4 are given. - M.G.G. [473(42)]

1389. QUAGLIA, A. (Univ. Bologna, Italy). Prove di diserbo chimico delle colture di cipolla. [Tests of chemical weed control in onions.] Riv. Ortoflorofruttic., Ital., 1959, 43, (5/6), 255-63, figs. 4, tabs. 4, bibl. 6.
Neburon 3.7 kg/ha, 2,4-DES 5.7 kg/ha and chlorpropham (25% emulsion) 20 l/ha were all toxic to onions when applied at the 3-leaf stage in May, but caused only temporary injury when applied at a later growth stage (not specified) in June. Weed control was good with 2,4-DES and chlorpropham, but was less effective with neburon and the lower rates of the other two. Mature grasses and Convolvulus arvensis were resistant to chlorpropham. - D.M.L.S. [76(45)]

1390. WAGGONER, P.E., MILLER, P.M. and de ROO, H.C. Plastic mulching. Principles and benefits. Bull. Connecticut agric. Exp. Sta., 1960, 634, pp. 44, figs. 16, tabs. 18, bibl. 19.
The results are given of an extensive series of trials on the effect of mulches of black and translucent polyethylene films and a film of aluminium bonded to polyethylene film on the energy budget and temperature of the soils beneath and on the growth and disease incidence in strawberries and tobacco. P.J.B. [26(74.5)]

1391. BRACEY, P. The place of residual herbicides in the garden and nursery. J. roy. Hort. Soc., 1959, 84, (4), 179-83.
The results of herbicidal trials with nursery stocks are reviewed, from which it was concluded that where 2,4-DES and chlorpropham were used for residual weed control the former was best suited for summer use and the latter for winter. Combinations of 2,4-DES + fenuron and chlorpropham enabled much lower quantities of each to be used than where each was applied separately. In trials with Liquidambar, Cornus, Aronia, Quercus, Malus spp., Rosa canina and deciduous azalea hybrids, 2,4-DES alone at 4-8 # gave poor weed control, but caused no injury to the stocks. The addition of fenuron 0.5 # to 2,4-DES 4 # kept rose briar stocks free from weeds for 6 weeks when applied to hoed soil. Chlorpropham applied in June, even at rates as high as 8 #, gave poor control of Senecio vulgaris and injured rose briar and other stocks. 2,4-DES 6 # has given successful weed control when applied

immediately after hoeing to the following herbaceous species: Anchusa, Verbascum, Erigeron, Sedum, Paeonia, Scabiosa, Heliopsis and Chrysanthemum maximum; 2,4-DES 4 # + chlorpropham 2 # caused a check in growth. Trial results indicated that chlorpropham applied once between October and mid-December would maintain weed-free conditions up to May and that 2,4-DES was best applied in March or April after spring cultivation. For controlling perennial weeds in areas to be used for planting rose stocks, it is recommended that where the previous crop was a cereal, dalapon 5 # + fenuron 2 # should be applied after harvest, with no further soil treatment for 3 months. The rose stocks should then be planted after cultivation in March or April, with 2,4-DES applied overall. Species of shrubs which have shown injury after treatment with 2,4-DES have included Euonymus spp., the Berberis wilsoni group, newly-planted ornamental cherry spp., Veronica and Forsythia (the latter when planted out from 3 in. pots) Myrobalan plum seedlings, Stachyurus spp., Acer negundo, Viburnum spp., 1-year-old Alnus spp. and Ribes spp. Brief recommendations are also given for weed control in strawberries and vegetable crops. - P.J.B. [O.BO.]

1392. McCLINTOCK, D. Alien lawn weeds. J.roy.Hort.Soc., 1960, 65,(6),276-80, bibl.10.

Notes are given on various introduced weeds of lawns in Gt Britain, including the following: Veronica filiformis, V. repens, Epilobium nerterioides, Cotula dioica, C. squalida, Hydrocotyle moschata, H. rotundifolia, Pratia treadwellii (= P. angulata?), P. arenaria, Nertera granadensis, Sagina glabra, S. pilifera, Helxine soleirolei, Androsace sarmentosa, Oxalis corniculata, Dichondra repens, Selliera radicans and Linaria hepaticifolia. The most important weeds are stated to be Veronica filiformis and Cotula dioica. Many of the others mentioned are very local in occurrence. - P.J.B. [O.BO.]

1393. ROBINSON, D.W. (Hort.Centre, Loughgall,Co.Armagh,N.Ireland). The control of Ranunculus repens (L.) in raspberries. Weed Res., 1961, 1,(2),105-13, (E.g.f.), tabs.5,bibl.9.

A report is given of trials in N. Ireland from 1957-60 with various herbicides for the control of Ranunculus repens in raspberries. The following herbicides were used in the preliminary ground-application trials: MCPA butoxyethyl and butyl esters and potassium salt, 2,4-D butoxyethyl ester, triethanolamine and sodium salts, MCPB sodium, 2,4-DB butyl ester and sodium salt and mecoprop sodium. All, except mecoprop, were applied at 2.2 kg/ha in a band 50 cm wide on either side of the row, wetting the canes to a height of 12 cm above the ground, in October and November 1959 and January and March 1960. MCPA salt and esters were the most effective. All herbicides gave better control when applied in March and October, though MCPA was also effective in November. The above-listed herbicides, except MCPA butyl ester, were applied at different rates in trials in October and December 1959. Most effective control was obtained with MCPA butoxyethyl ester 1.1 kg/ha and MCPA potassium 2.2 kg/ha; 2,4-DB butyl ester 2.2 kg/ha was also effective. Compared with hand-hoed control plots, MCPA potassium 2.2 kg/ha applied as a ground application in December did not affect the yield of the varieties Malling Jewel, Malling Landmark and Seedling V after 3 consecutive years' treatment, or that of the varieties Malling Promise, Malling Notable, Seedling M, Malling Exploit and Newburgh after 1 year's treatment in 1957. Treatment with the same herbicide at 1.1 and 2.2 kg/ha did not affect the yield of Malling Jewel when applied in January or that of Lloyd George when applied in November. Yields of Lloyd George treated with MCPA butoxyethyl ester 1.1 kg/ha and MCPA potassium 2.2 and 4.5 kg did not differ significantly from that of plots treated with MCPB sodium 4.5 kg, 2,4-D triethanolamine 2.2 kg, 2,4-D butoxyethyl ester 1.1 kg, 2,4-DB sodium 4.5 kg and 2,4-DB butyl ester 2.2 kg/ha, or those of control plots. However, some damage occurred in stoolbeds when these chemicals were applied at twice the highest rates given. MCPA and MCPB killed some underground buds and it appeared that its margin of safety was low.

Salt formulations of MCPA, 2,4-D, MCPB, 2,4-DBand mecoprop and ester formulations of MCPA, 2,4-D and 2,4-DB at 1000 p.p.m. were applied overall to run off in January and at 2000 p.p.m. in March, October and February to var. Lloyd George. Damage of varying degrees was caused only by the March application, just after bud-burst. No injury was caused by applications when the canes were dormant.

Winter spraying is much affected by the weather and requires heavier doses than in the spring. The crop showed no marked physiological tolerance and the degree of control depended on the growth of R. repens

while the canes are dormant. In the absence of any other chemical, MCPA salt 2.2 kg/ha in late November or December is recommended. Diquat dibromide at low rates (about 1.1 kg/ha) has been shown in recent trials to be a promising alternative. - M.G.G. [O.W.]

1394. GREAT BRITAIN, NATIONAL AGRICULTURAL ADVISORY SERVICE. N.A.A.S. Regional experiments in horticulture. Summary of experiments in progress, October, 1960 - September, 1961. Publ.Minist.Agric.,Fish, Fd, [n.d.], pp.71.
Includes details of weed control trial treatments for apple, pear, blackcurrant, gooseberry, strawberry, runner bean, carrot, lettuce, onion, rhubarb, tulip, narcissus, gladiolus, rose and glasshouse crops of lettuce and cauliflower. - P.J.B. [O.W.]

1395. BÖHME, F. and FUNK, T. (Saatzucht-Wildlingsanzucht Altenweddingen,E.Germany). Erfahrungen mit der chemischen Unkrautbekämpfung in Obstsaatbeeten. [Experiences with the chemical weed control in fruit tree seedbeds.] Der neue Dtsch Obstbau, 1961, 7,(4),74-5, figs.4,tabs.4.
In field trials in East Germany during 1959-60, E.P.30 (PCP) and W 6658 (aminotriazine herbicide) were applied to Prunus mahaleb, P. avium, P. cerasifera, apple and pear seedbeds. W 6658 3-5 kg/ha in 600-1000 l water pre-em. gave efficient control of weeds, except Agropyron repens, but injured all the mentioned tree seedlings, except pear. Similar rates of E.P.30 gave satisfactory weed control for the first few weeks after application, but failed to prevent weed germination later; tree seedlings were slightly injured. - J.L.M. [286(43)]

1396. FISHER, E.G. Extension suggestions for trial use of herbicides on young non-bearing fruit trees. Mimeo.Publ.,Dep. Pomol.Cornell Univ., 1960, F-104,pp.3.
From trials with non-bearing trees, the following herbicidal treatments are recommended, (a) simazine 5 # applied pre-em. (of weeds), (b) on apples and pears only, a dowpon [84% sodium dalapon] 8-10 # + simazine 5 # where the weed cover is primarily grass 4-6 in. high, (c) a low-volatile salt formulation of 2,4-D 1-1.5 # applied post-em. (of weeds) for broadleaf weed control, safe for use on most apple varieties, but not on pear or Winesap apple, alternatively Dow General or Sinox General [both dinoseb 55%] + 10 gal oil in 100 gal water. For the above applications 80° fan-type nozzles delivering 100 gal spray/ac at 30-40 p.s.i. is recommended. A table gives the number of trees which can be treated for different radii of treated area around the trunks. - J.L.M. [134(74.7)]

1397. FISHER, E.G. Herbicide suggestions for 1961. Mimeo.Publ.,Dep.Pomol.Cornell Univ., 1960, F-125,p.1.
Simazine (80% a.i.) 3.5-5.0 # applied pre-em. (of weed), or at 3.5-5.0 # + amitrole 3 # applied post-em. (of weed) is recommended for weed control in plantations of young non-bearing trees. A table gives the recommended distances from the trunks of bearing trees to be left untreated when dowpon [84% sodium dalapon] 10-12.75 # is used to control grasses in apple, pear, plum, and peach orchards. - J.L.M. [133(74.7)]

1398. CASELEY, J. The tolerance of fruit crops to some residual herbicides. Annu. Rep.Univ.Bristol Agric.and Hort.Res.Sta., 1960, pp.59-63.
In studies to determine the tolerance of different fruit crops to residual herbicides applied to the roots or to the leaves, two series of experiments were conducted. In the first, amiben 12 # and simazine, monuron and diuron at 6 #, each in 100 gal spray volume,were applied to 2-year-old plants of apple, pear, plum, raspberry, blackcurrant and redcurrant, and simazine 0.5 or 1 # and neburon 1 #, each in 100 gal spray volume were applied to 7 varieties of strawberry. All plants were grown in sand and the herbicides leached into the root zone. Amiben was the least injurious of the herbicides used, though it has proved relatively ineffective for weed control under Long Ashton conditions. The urea compounds caused severe injury in many plants; exceptions to this were varieties Bramley's Seedling and Cox's Orange Pippin of apple and Favourite of strawberry. Damage from monuron appeared more rapidly than that from diuron. Simazine caused less severe and rapid injury than the ureas and all 3 apple varieties (Lane's Prince Albert, Bramley's Seedling and Cox's Orange Pippin), Victoria plum and Favourite strawberry showed innate tolerance to this herbicide. In the second trial series, amiben 12 # and simazine, monuron and diuron at 6 #, each in 100 gal spray volume, were applied to the foliage of apple, pear, plum, raspberry, blackcurrant and redcurrant. Simazine was outstanding as being

the only herbicide which caused no damage in any species or variety and the results suggested that simazine at rates up to 6 # was safe for use with apple and plum.
P.J.B. [O.W.]

1399. HEWETSON, F.N. Chemical weed control in the peach nursery. Prog.Rep.Pennsylvania agric.Exp.Sta., 1960, 223, pp.2, figs.3, tabs.2.
Applied pre-em. (of weeds) to peach seedling stocks, a mixture of 2,4,5-TES, 4 # + chlorpropham 2 # in 66 gal water/ac, the lowest spray rate used in the trial, gave good control, with no injury to the trees. A table comparing the man-hour requirement and costs of weed control in peach seedlings are given. - J.L.M. [44(74.8)]

1400. LEONARD, O.A. and LIDER, L.A. (Univ. California,Davis,U.S.A.). Toxicity and translocation of herbicides supplied to grape rootings through solution culture. Amer.J.Enol.Vitic., 1961, 12,(1),37-46, tabs.5,bibl.14.
In trials to study herbicidal injury in vines, rooted cuttings of two varieties, Thompson Seedless and Perlette, were placed for 3 days in solution cultures containing monuron, diuron, simazine, atrazine, 2,4-D and amitrole at concentrations of 0, 0.25, 0.5, 1, 2 and 4 p.p.m., before being planted in herbicide-free media and grown for 98 days. In studies on the translocation of herbicides in vines, rooted cuttings were similarly treated with ^{14}C-labelled monuron, simazine, amitrole and 2,4-D. In the herbicidal injury studies, injury was directly related to herbicidal concentration, except for amitrole. Monuron and diuron at 0.25 p.p.m. both caused slight leaf chlorosis; there was no apparent difference between the effect of these two herbicides and it was concluded that the greater tolerance of vines to diuron than to monuron observed in the field is due to the lower leachability of the former. The triazine herbicides were appreciably less injurious than the ureas at the same concentrations. Both varieties were similar in their response to simazine and atrazine. No concentration of amitrole visibly affected the plants. Injury from 2,4-D ranged from no visible injury to total death; the injury appeared to be confined to the roots, though new roots appearing after the death of the old and after transfer to herbicide-free cultures were normal. In the translocation studies, 2,4-D was absorbed by the roots, but not translocated to the shoots. Monuron and simazine were absorbed by the roots and translocated to some extent to the leaves. Amitrole was absorbed by the roots and translocated to shoots present at the time of treatment; re-translocation to shoot growth after treatment was very limited. Absorption of herbicide was related more directly to leaf transpiration than to selective absorption by the roots and, from this, it was concluded that absorption of these herbicides by plants in the field during the dormant season would be very slight. In trials in which vines were grown in containers, there was no positive evidence of accumulation of 2,4-D, amitrole or simazine in the fruit, following applications of these herbicides at rates of 4 # for 2,4-D and simazine and 2 # for amitrole, in combination with leaching treatments. There was some evidence of ^{14}C-labelled decomposition products of simazine in the fruit.
P.J.B. [221(79.4)]

1401. GUPTA, O.P., BHARDWAJ, R.B.L. and VERMA, R.D. (Agronomy Div.,Indian Agric. Res.Inst.,New Delhi-12,India). Weeds and their control in sugarcane fields in India. Ind.J.Agron., 1960, 5,(2),126-32, bibl.46.
A review covering the following aspects; losses caused by weeds, the weed flora of sugar-cane fields, and weed control by cultural, chemical and biological methods.
J.W.F. [O.RE.]

1402. DEDECA, D.M. Plant pests of coffee. Sao Paulo.Supt.dos Serv.do Cafe, 1959, B.34,(386),16-20,(Portuguese).
Weeds of coffee in Brazil are reviewed.
P.J.B.

1403. NAIR, R.G. (Central Coconut Res. Sta.,Kasaragod,India). Role of hormonal weedicides in the control of weeds in coconut plantations. Coconut Bull., 1960, 14,(8),296-302.
The problem of weeds in coconut plantations is reviewed, with particular reference to competition for water and nutrients. The use of herbicides for controlling weeds is discussed briefly. - P.J.B. [Md.H.]

1404. NEURURER, H. (Bundesanst.f. PflSchutz,Wien,Austria). Möglichkeiten einer chemischen Unkrautbekämpfung in Baumschulen. [Possibilities of chemical weed control in tree nurseries.] Gartenbau Wirtsch., 1960, (2),244-6.
Cultural and chemical methods of weed

control in fruit tree nurseries is reviewed. In the relatively wet conditions of 1960 in Austria, weed control with practical rates of chlorpropham, 2,4-DES and OMU + BiPC was unsatisfactory. Weed control with simazine and Gesaprim [atrazine 50% wettable powder] was good, except against Convolvulus arvensis and Echinochloa sp. P.J.B. [58(436)]

1405. FABER, H. (PflSchutzAmt,Rellingen, Schleswig-Holstein,Germany). Der Stand der Unkrautbekämpfung in Baumschulkulturen. [The state of weed control in tree nurseries.] Gesunde Pflanze, 1961, 13,(7), 174-7.

The results are described of trials in 1958-59 in which effective weed control in seedbeds was obtained by, (1) 100-200 l allyl alcohol in 30 000-50 000 l water/ha applied 6-8 days before sowing during cool weather, (2) alipur [16% OMU + 11% BiPC] 4 l in 1000 l water/ha pre-em. (weed and crop) <5 days after sowing (alder and birch are susceptible; overdosage and multiple application should be avoided), (3) undiluted mineral oil 700 l/ha or flaming post-em. (weed) and pre-em. (crop), (4) mineral oil post-em. (weed and crop) used principally on fine seedlings, (5) simazine or alipur (rates unspecified) pre-em. (weed) and post-em. (crop).

Efficient weed control in transplanted seedlings was obtained by (1) alipur 4-6 l/ha and simazine spray 2-3 kg/ha or simazine granular 60 kg/ha [a.i. not stated] pre-em. (weed), and mineral oil 700 l/ha or dinoseb [rate unspecified] post-em. (weed) during the dormant period, or (2) simazine granular 40-60 kg/ha [a.i. not stated] + simazine spray 2-3 kg/ha pre-em. (weed) during seedling growth. - J.L.M. [O.W.]

1406. PETSCHKE, K. (Institut für Waldbau,Tharandt,East Germany). Die Anwendungun Herbiziden in der Kultur-- und Jungwuchspflege Sowie bei der Grünastung. [The use of herbicides in plantation and nursery cultivations, and with pruning.] Forst.u.Jagd, 1961, 11, (6),255-6,273-5, figs.1,tabs.1,bibl.1.

The properties and application on forest plantations of 2,4-D + 2,4,5-T esters, the sodium salts of 2,4-D, MCPA, dalapon and TCA and calcium chlorate for weed control in forest plantations is discussed. Among those cited are the following weeds with control methods as used in trials in 1958-60. Pteridium aquilinum: amitrole 15-20 kg/ha, calcium chlorate 300 kg/ha applied in the spring on ground intended for planting in the summer with a second application 150 kg/ha in the autumn. Calamagrostis epigeios: dalapon sodium 25-30 kg/ha applied in May or June, or TCA sodium 150-200 kg in March or November; lower rates controlled C. arundinacia and C. villora. Molinia caerulea: dalapon sodium 20-25 kg applied in May or June, or TCA sodium salt 100-150 kg in March or November. Deschampsia flexuosa: dalapon sodium 15-20 kg applied in May or June or TCA sodium salt 80-100 kg in March or November. Vaccinium myrtillus, Calluna vulgaris, Rubus fruticosus, R. idaeus, and Sarothamnus scoparius were controlled effectively with 2,4-D + 2,4,5-T at approximately 10 l/ha (% a.i. not stated), and 2,4-D sodium and MCPA sodium 8-10 kg/ha.

Birch and aspen in spruce and pine nurseries were controlled by 2,4-D + 2,4,5-T 4-6 l/ha (% a.i. not stated) and 2,4-D sodium and MCPA sodium 3-5 kg/ha, applied after apical bud formation in spruce and pine. Shoots of unspecified trees ca. 2 m high were killed with 2,4-D + 2,4,5-T 1% water emulsion (% a.i. not stated). Taller shoots were killed by basal applications of 2,4-D + 2,4,5-T 8% diesel oil emulsion (% a.i. not stated). Suckers of oaks with trunks < 20 cm d.b.h. were killed by a complete coverage to 6 m above ground level of 2,4-D + 2,4,5-T 1% water emulsion (% a.i. not stated). 2,4-D + 2,4,5-T 1% water emulsion (% a.i. not stated) applied in June or July was effective and economic as a substitute for the mechanical pruning of the lower branches of beech trees. - J.L.M. [287(43)]

1407. MORROW, R.R. (Agric.Res.Sta.,Cornell Univ.,Ithaca,New York,U.S.A.). Fighting brush, weeds, and grass with chemicals. Amer.Christmas Tree Grow.J., 1960, 4,(3), 12-3.

A review of the use of amitrole, fenuron, dalapon and simazine in Christmas tree plantations, the advantages of their application in granular form, and the benefits of grass establishment to replace and inhibit woody weeds. - J.L.M. [132(74.7)]

1408. BURNS, P.Y. (For.Sch.,Louisiana State Univ.,Baton Rouge). Use of aircraft for foliar applications of herbicides in Southern forests. Proc.9th Annu.For.Symp., Louisiana 1960, 1961, 73-83, figs.3,bibl.33.

Reviews herbicides, spray rates and volume, and formulations used for aerial spraying of

hardwood brush species, aircraft and spray equipment, boundary marking, season and brush stand conditions suited to aerial spraying, hazards and precautions, the effect of aerial spraying on hardwood and pine species, and costs and benefits to be expected. The usual spray prescription in the southern States of the USA is 2,4,5-T ester 2 # in 5 gal oil/water carrier, applied when hardwoods are actively growing. Complete control of hardwood species is rarely secured, but control is usually sufficient to release pines from overtopping hardwoods, without permanent injury to the pines. Treatment costs are normally $7-12 per ac. - P.J.B. [O.W.]

1409. LINNARD, W. (Commonwealth For.Bur., Oxford,England). A summary of information on the control of Loranthaceae in forestry. For.Abstr., 1961, 22,(3),345-52, bibl.60.
An extensive review covering the following methods used for control of the Loranthaceae in forestry: on pruning and removal of infected trees, burning, modifications of management systems, the use of resistant tree species, biological control with hyperparasitic plants, insects, birds and mammals, and chemical control by spray or injection treatment. Stem-injection techniques appear to have definite advantages over spraying, and organic herbicides, especially 2,4-D, to give better results than inorganic chemicals. J.W.F. [O.W.]

BIOLOGY OF WEEDS AND POISONING BY WEEDS

1410. CUMMING, B.G. (Canada Dep.Agric. Pl.Res.Inst.,Ottawa,Canada). Photoperiodic response in the genus Chenopodium as related to geographical distribution. Plant Physiol. (Suppl.), 1961, 36,li,(Abstract).
The results of studies with 35 species of Chenopodium indicated that in temperate N. America, most annual species were short-day plants. The results are given of laboratory experiments with C. rubrum derived from locations ranging from Yukon to California and grown under different day lengths and at different temperatures. - P.J.B. [O.W.]

1411. STANIFORTH, D.W. (Iowa State Univ., Ames,U.S.A.). Crop-weed ecology in relation to weed control research. Proc.14th Southern Weed Conf., 1961, 10-16.
Ways in which studies of crop-weed ecology can contribute to the improvement of weed control practices are reviewed and illustrated with examples of studies of competition between maize and Setaria lutescens, and between soybeans and annual weeds. - P.J.B. [O.W.]

1412. SANTELMANN, P.W. and MEADE, J.A. (Maryland Agric.Exp.Sta.,College Park, U.S.A.). Variation in morphological characteristics and dalapon susceptibility within the species Setaria lutescens and S. faberii. Weeds, 1961, 9,(3),406-10, tabs.3,bibl.10.
Wide variations in growth habit, height, leaf width, lodging, number of heads, rate of seed development, and susceptibility to dalapon were found in plants grown from 9 seed samples of S. lutescens selections and 16 samples of S. faberii selections, collected from different locations and treated with dalapon both in the field and the glasshouse. It is suggested that these variations may partially account for failures in the use of herbicides for control of Setaria spp. The data are recorded. Authors' summary modified. D.M.L.S. [O.W.]

1413. INGLE, M. and ROGERS, B.J. (Purdue Univ.,Lafayette,Indiana,U.S.A.). The growth of a midwestern strain of Sorghum halepense under controlled conditions. Amer.J.Bot., 1961, 48,(5), 392-6, figs.3,tabs.4,bibl.7.
The effects of two photoperiods of 12 and 16 hours with temperatures of 16°, 21°, 27° and 32°C on the growth, flowering and rhizome bud sprouting of Sorghum halepense were studied. Under long-day conditions (16 hour photoperiod) growth increased as temperatures increased from 16° to 32°C, but under a 12 hour photoperiod growth increased only over the range 16° to 27°C and decreased under a temperature of 32°C. The difference between the 12 and 16 hour photoperiod was most marked in its effect at 32°C, when the 4 hour increase in day-length resulted in a 40% increase in plant height and a 5-fold increase in dry matter accumulation. Flowering usually occurred under photoperiods of 12 hours or less, though vegetative growth continued to increase as photoperiods increased beyond 12 hours. Both sprouting of rhizome buds and dry weight of shoots produced, increased as temperatures increased from 16° to 27°C. Rhizomes from Michigan had a lower optimum temperature for sprouting than those from

S. Indiana. The buds on all rhizomes tested produced aerial shoots only. - M.G.G. [O.W.]

1414. GALLINGER, D. and SMITH, D.R. Halogeton studies. Mimeo Circ.Wyoming agric.Exp.Sta., 1958, 114,1-21, figs.15, tabs.5.

A report is given of studies during 1958 on Halogeton glomeratus on saltsage pastures, typical of winter sheep ranges. The pastures were established in 1956 to determine the effect of different grazing intensities on the spread of H. glomeratus. Invasion of H. glomeratus increased on pastures on which drainage channels were liable to flood under conditions of heavy run-offs and thus disseminate the seeds. Topography, rather than the degree of forage utilisation, governed the extent of invasion. Seed-burial trials, begun in 1957, were continued. Packets of 100 black or brown seeds, buried 0, 1, 3 or 6 in. deep in the soil were to be exhumed after 1, 2, 4, 6 or 10 years. In germination trials with seeds exhumed after 1 year, a small % of brown seeds subjected to soil-surface conditions, germinated, suggesting that germination inhibitors had been leached out. All black seeds had germinated or lost viability. Analyses were made of the different horizons of soil profiles under saltsage (Atriplex gardneri) and Artemisia tridentata communities. Saltsage soils had high pH and high content of exchangeable sodium. The salinity attained toxic levels in the C horizons of some soil samples. Soils under A. tridentata had a low pH and low content of exchangeable sodium. Soil fertility characteristics of the two communities were similar. Observations were made of the shrub vegetation of each community. - M.G.G. [28(78.7)]

1415. BÖNING, K. and BOLLOW, H. Massenauftreten des Ampferblattkäfers (Gastroidea viridula DEG) und andere Schadenserreger an grossblättrigen Ampferarten, zugleich ein Beitrag zur biologischen Unkrautbekämpfung. [Large scale appearance of dock-leaf beetles (Gastroidea viridula) and other injurious insects on broadleaf dock varieties, at the same time a contribution to biological weed control. Pflanzenschutz 1959, 11,(8), 109-113, figs.67, bibl.36.

The biology of Rumex species and damage caused by G. viridula and Pegomyici nigritarsis, P. bicolor, and P. haemorrhoa are reviewed, together with a brief note on the effect of these insects on natural populations of Rumex spp. - J.L.M. [291(43)]

1416. HARPER, J.L. and McNAUGHTON, I.H. (Univ.Coll.N.Wales,Bangor). The inheritance of dormancy in inter- and intraspecific hybrids of Papaver. Heredity, 1960, 15,(2/3), 315-20, tabs.1, bibl.9.

Hybrids between Papaver spp. commonly lack seed dormancy, though this is usually pronounced in the parent species. The absence of dormancy in the seed of interspecific hybrids permits the seed to germinate in the field in autumn. Hybrid seedlings are thus commonly destroyed by winter frosts. The genetics of seed dormancy is briefly reviewed and some indications regarding the determination of seed dormancy in Papaver spp. are discussed. Partly authors' summary. - D.M.L.S. [479(42)]

1417. HARPER, J.L. and DANICA, G. (Dep. Agric.Bot.,Univ.Coll.N.Wales,Bangor). Experimental studies of the mortality and plasticity of a weed. Weed Res., 1961, 1, (2),91-104,(E.g.f.), figs.10, bibl.9.

Experiments are described to demonstrate the way in which a population of annual plants reacts to an increase in density so that the population becomes self-regulatory. Agrostemma githago was sown in April at densities of 0, 1076, 5380 and 10 760 seeds/m^2, with wheat sown at 120 and 600 grains/m^2 or sugar beet at 24 and 120 clusters/m^2. Mortality and plastic response in size and reproductive capacity of individuals of A. githago were calculated at harvest in September when the wheat was judged to be ripe. Mortality, calculated from the highest number of plants/m^2 of A. githago present, was greatest in the densest plots of A. githago grown with sugar beet 120 clusters/m^2. Plots with a high density of wheat + A. githago showed a slightly lower mortality. Plastic response in size and reproductive capacity were determined by (a) mean number of capsules/plant, which was lowest in A. githago grown with high wheat populations; (b) mean seed number/capsule, which fell in all populations as the density of A. githago increased, but most markedly in wheat populations; (c) mean seed weight, which decreased as A. githago density increased, both in pure stands and in plots with wheat. Explanations are given for the fact that the heaviest seeds were found in the wheat plots. These results show that an increase in density of A. githago results in an increase in mortality

and in a variation in plant size and reproductive capacity. Also that one or both of these reactions are influenced by the presence of wheat or sugar beet.
The variations in the yield of the crop were also measured. The number of ears/m^2 and the mean weight of grain/m^2 of low density wheat populations were considerably reduced when grown with A. githago, though there was little effect where wheat populations were high. The mean weight of sugar beet/m^2 varied widely at the 2 sowing rates when A. githago was absent, but showed little difference where it was present.
Intra-plant variation, as shown by histograms of number of capsules/plant, was very variable in low populations of A. githago ± beet. In populations with increased populations of A. githago ± beet or + wheat, or with low populations of A. githago + wheat, capsule numbers were mostly 0 to 2. The relation of seed input and output to mortality and plasticity is shown. The significance of these observations for understanding the mechanism of natural selection is stressed. - M.G.G. [O.W.]

1418. * KULPA, W. Owoce i nasiona chwastorv. Klucze do oznaczania. [Fruits and seeds of weeds. Keys for identification.] Warsaw 1958, PWN 8, pp.419, $2.40, figs.237.

1419. AGRICULTURAL RESEARCH. Supplement protects sheep from halogeton. Agric.Res. (Wash.), 1961, 10,(2),5.
In 3 years' feeding trials at Logan, Utah, good results in countering the toxic effect on sheep of halogeton [H. glomeratus] have been obtained by including lucerne pellets containing 5% dicalcium phosphate in their diet. - D.M.L.S. [O.W.]

1420. PORTERES, R. Une cereale toxique de ramassage dans l'Ouest-Africain (Paspalum scrobiculatum L. var. polystachyum Stapf.). [A toxic cereal in West Africa (P. scrobiculatum L. var. polystachyum Stapf.)]. J.Agric.trop. et Bot.appl., 1959, 6,(12),680-4, figs.1, bibl.9.
Reports, mainly derived from the literature, are given of the biology and toxicological properties of the grain of (a) Paspalum conjugatum, (b) P. scrobiculatum var. commersonii and (c) P. scrobiculatum var. polystachyum. P. conjugatum is reported to compete severely with regenerating brush and forest species. There appears to be some evidence that its grain may occasionally contain HCl or cyanogenetic substances. The grain of (c) is reported to be toxic, but no alkaloids or glucosides have been isolated. It is thought that toxicity may be endomycotrophic, as in the case of Lolium temulentum. - P.J.B. [G.R.I.]

AQUATIC AND WOODY WEEDS AND THEIR CONTROL

1421. WIEDEMANN, W. Die chemische Grabenentkrautung in wasserrechtlicher Sicht. [The chemical control of weeds in ditches from the standpoint of the water laws.] Wasser u.Boden, 1961, 13,(5),pp.2.
The legal implications of chemical weed control of ditches in Germany and some variations in the laws between districts are briefly reviewed. No permission to apply herbicides in ditches is required, but any damage caused thereby must be made good by the person applying the herbicide without proof of his culpability being required, even where the material used is guaranteed by the manufacturer as harmless and the application instructions have been followed. Deliberate or incompetent application of herbicide leading to water pollution is liable to prosecution.
J.L.M. [288(43)]

1422. KARIBA LAKE COORDINATING COMMITTEE. The problem of the water weed Salvinia auriculata on Kariba Lake. Pest.Abstr. News Summary C., 1961, 7,(2/3),73-6.
The plant and its origin, spread, and methods of growth and spread, are described and its effect on fisheries and navigation in Lake Kariba briefly discussed. A scientific sub-committee set up by the Kariba Lake Coordinating Committee has instituted exploratory trials with herbicides. Mechanical control methods and the autecology of the weed are to be investigated and consideration is being given to biological control. Possible commercial uses of S. auriculata are also being examined. - D.M.L.S. [O.W.]

1423. LHOSTE, J. La destruction de la vegetation aquatique on semi-aquatique envahissant les cours d'eau. [The destruction of aquatic and semi-aquatic vegetation invading water courses.] (Publ.) Off.Rech.sci.tech.Outre-Mer, [n.d.], pp.42, tabs.6, bibl.13.

A review which includes (1) a list of aquatic and semi-aquatic plants of France, (2) mechanical and chemical methods of control with rates of herbicides used for different types of vegetation, (3) effects of treatments on fauna, with a table giving the toxicity of 16 herbicides to fish, and (4) the effects of treatments on the plant succession. - D.M.L.S. [120(44)]

1424. BYRNES, W.R. (State Univ., University Park, Pennsylvania, U.S.A.). Chemical weed and bush control. Amer. Christmas Tree Growers J., 1960, 4, (4), 13-16, 39.
A review of the current procedures for brush and weed control, pre- and post-planting. Methods of application for woody brush, application rates and carriers are given for the following herbicides: 2,4-D, 2,4,5-T, fenoprop, sodium arsenite, AMS, dalapon, simazine, amitrole and some substituted ureas. Some of the weeds controlled are listed. - M.G.G. [45(74.8)]

1425. GORDINIER, E.J. and HEATH, R. Improving wild life habitat with herbicides. Inf. Circ. Michigan Dep. Conserv., Game Div., 1959, 117, pp. 7.
Methods of improving wild life habitats in Michigan by the use of herbicides are reviewed. For controlling aspen [Populus sp.], aerial applications of 2,4-D 2 # in 1 gal oil + 2.5 gal water is in use at present, though this rate of spray volume appears to give incomplete coverage from the air. Applications made in May and June are considered to give the best results. To obtain maximum resprouting of aspen, and hence best rejuvenation of deer browse, it is recommended that 2,4-D be applied when root reserves are high. For best root kill, 2,4-D should be applied during a 4-6 weed period after full leaf development, when root reserves are lowest. For controlling Agropyron repens as a preliminary to establishing shrubs, trees, etc., it is recommended that dalapon 10 # should be applied in late October or early November and the area ploughed 2 weeks later to expose the rhizomes to frost. In aquatic habitats, leatherleaf [Chamaedaphne calyculata] has been controlled by AMS at 62 # in 250 gal water, but it is thought likely that relatively low rates of 2,4-D and 2,4,5-T would also be effective. For controlling cattail [Typha sp.], amitrole 2 # + dalapon 5 # applied in late July, appeared promising. - P.J.B. [87(77.4)]

1426. KIRCH, J.H. (Amchem Products, Inc., U.S.A.). Foliar application of chemicals to weed tree species. Proc. 9th Annu. For. Symp., Louisiana, 1960, 73-83.
Factors (especially formulation) influencing the absorption and translocation of 2,4-D and 2,4,5-T by plants are reviewed, with particular reference to the manner in which these factors affect the formulation and application of herbicides as foliar sprays for the control of tree species. - P.J.B. [O.W.]

1427. PEEVEY, F.A. (Weed Invest. Grazing Lands, Agric. Res. Serv., U.S. Dep. Agric., Box 1192, Alexandria, Louisiana, U.S.A.). Basal application of herbicides for control of woody plants. Proc. 9th Annu. For. Symp. 1960, 1961, 66-72, tabs. 16.
The results are given of trials at the Southern Forest Experiment Station on the use of cut-surface, basal-stem and injection treatments and soil application methods of applying herbicides for the control of trees. Solutions of 8 lb 2,4,5-T per 100 gal oil or 2 lb AMS per gal water were effective when applied in spring or early summer to frills just above ground level. Excellent control of Quercus marilandica was secured by treating trees with trunks of < 8 in. d.b.h. at all seasons with a solution of 8 lb 2,4,5-T in 100 gal diesel oil applied to the lower 8-12 in. of trunk at 48-64 ml/in. of stem diameter. Treatment of stumps to control regrowth was also effective. Injection of trunks with solutions of 12-32 lb a.e. of 2,4,5-T ester in 100 gal diesel oil to give 8 ml of solution per incision spaced 2 in. apart around the base of trees < 9 in. d.b.h. gave, in many cases, complete kill of Q. marilandica and Q. stellata; species with a greater degree of natural resistance to herbicides required injections spaced 1 in. apart to give satisfactory control. Upland hardwood species were effectively controlled by soil applications of fenuron spray, powder or granules at 2 g a.i. per 4 in. of trunk diameter in late winter or spring. Costs of the different treatments are given. - P.J.B. [O.W.]

1428. BERNTSEN, C.M. (Oregon State Coll., Corvallis, U.S.A.). Chemical control of big-leaf maple (Acer macrophyllum) trees and stump sprouts. Res. Note U.S. Forest Serv. Pacific Northwest Forest and Range Exp. Sta., 1960, 192, pp. 9, figs. 4, tabs. 3, bibl. 2.
Trials were conducted on the control of sprouting from the bases of large trees of

Acer macrophyllum (9 to 29 in. diameter and a maximum height of 60 ft) in regenerating stands of Douglas fir (Pseudotsuga menziesii) and associated conifers. The amine and propylene glycol butyl ether esters of 2,4,5-T and fenoprop at 4 lb/gal, amitrole (50% a.i.) and 2,3,6-TBA Na salt at 1.5 lb/gal in water or 3 lbs/gal oil, were applied as (a) basal spray to a height of 2 ft above ground, (b) as a frill treatment in axe cuts 3 in. apart, or (c) as stump sprays within 2 days of cutting. The sprays were applied to run-off in June 1956, a hot, dry month. Fenoprop ester in oil applied as a basal spray killed or gave 90% defoliation of 7 out of 15 trees treated after 3 years and is recommended for the control of A. macrophyllum. Less than 20% defoliation was obtained with the other herbicides. Frill treatments with all herbicides gave poor control because of limited lateral translocation. Sprouting in both treatments occurred mostly from trees suffering 40 to 50% defoliation; sprouting from trees $<10\%$ or $>90\%$ defoliation was slight. Fenoprop ester in oil or water and 2,4,5-T ester in oil, applied as stump sprays, gave good control and are recommended. Stumps so treated, produced only a few small sprouts which did not compete with young conifers. 2,4,5-T ester in water, 2,4,5-T and fenoprop, 2,3,6-TBA sodium in oil, applied as stump sprays were relatively less effective. Amitrole and oil-soluble 2,3,6-TBA gave no control. The additives bentonite and pyrrolidone did not increase the effect of the herbicides in any treatment. - M.G.G. [O.F.]

1429. KAY, B.L., LEONARD, O.A. and STREET, J.E. (Univ.Calif.,U.S.A.). Control of madrone and tanoak stump sprouting. Weeds, 1961, 9,(3),369-73, figs.6,bibl.6.
Daubing stumps of Arbutus menziesii and Lithocarpus densiflora with a solution containing 4 lb per gal a.e. of mixed alkanolamine salts of 2,4-D per gal gave better control of sprouting and was cheaper than spraying the stumps with a solution of 16 lb a.e. butoxy ethanol esters of either 2,4-D alone or 2,4-D + 2,4,5-T per 100 gal diesel oil. Treatments in February, April, and October, but not July, were successful against A. menziesii. February and October treatments were best for L. densiflora, whereas April and July treatments gave poor results. The treatments were applied immediately after cutting. - D.M.L.S. [O.W.]

1430. WAHLIN, B. (Statens Växtskyddsanstalt, Sweden). Berberis utrotnung angelägt höstarbete. [Barberry eradication urgent autumn work.] LantbrTidskr.Stockh. LänochStad, 1960, 10,(3),20-1.
Recommendations for eradicating Berberis spp. in Sweden include the use of sodium chlorate (0.3 l sodium chlorate dust per bush 1 m in crown diameter), preferably applied in autumn. - P.J.B. [166(485)]

1431. BONDARENKO. D.D. Poison ivy is easy to kill. Ohio Fm Home Res., 1961, 46,(4),58-9.
Brief recommendations are given for the control of Rhus radicans with 2,4-D + 2,4,5-T mixture, amitrole and AMS. P.J.B. [55(77.1)]

1432. ANDERSEN, N. (Steinsnes,Horten, Norway). Mistletoe: a rare and protected plant in Norway. Norsk.Hagetid., 1960, 76,(8),166-7.
A brief note is given on the occurrence of mistletoe in Norway, where it is very rare and is now officially protected. - P.J.B. [Md.H.]

OTHER WEEDS AND THEIR CONTROL

1433. STORHAUGEN, O. Driftsplan på gardar med floghavre. [Management plans on farms with wild oats.] Norsk Landbr., 1961, 80,(4),108-9, figs.3.
A very brief outline is given of practical measures for controlling wild oats by means of crop rotations and cultural practices in Norway. - P.J.B. [G.R.I.]

1434. MATTHEWS, L.J. (Dep.Agric., Wellington,New Zealand). Weed identification and control. N.Z.J.Agric., 1961, 102,(6),525, figs.1.
The control of Chenopodium album and two locally important species C. pulmilio and C. murale, using MCPA and 2,4-DB, is discussed. - J.L.M. [O.W.]

1435. HOLZ, W. and FELDHUS. (PflSchutz-Amt,Oldenburg,Germany). Versuche der Bekämpfung des Kalmus (Acorus calamus). [Trials on the control of sweet flag (A. calamus)]. Gesunde Pflanze, 1961, 13, (8),190-4.

In trials in 1960, amitrole at 5, 7.5, 10 or 15 kg/ha in mixture with 2 l MCPA ester, was applied to A. calamus 1-1.2 in. tall. One year later, shoot numbers, where the different rates of amitrole had been applied, were 19.3, 9.1, 2.8 and 2, respectively, compared with 108 for untreated plots. MCPA ester at 2 l, alone, reduced shoot numbers to 37.1. A mixture of amitrole 10 kg + MCPA ester 2 l/ha, applied to A. calamus 80-100 cm tall (May-June), was considered practical for field use; at this rate, amitrole had only transient effects on the grass sward. - J.L.M. [O.W.]

1436. FARMERS' WEEKLY. The bracken eaters of Brecon. Fmrs' Wkly, 1961, 55,(12),60.
A note is given on the marked reduction of bracken on areas in Breconshire, Wales, as a result of grazing by sheep. Possible reasons for the acceptability of bracken to sheep under these conditions are given. - P.J.B. [O.W.]

1437. CONWAY, E. and FORREST, J.D. (Univ.Glasgow,Scotland). The effects of 4-chlorophenoxyacetic acid on the rhizome of Pteridium aquilinum (L.) Kuhn. Weed Res., 1961, 1,(2),114-30, (E.g.f.), figs.4,tabs.4,bibl.11.
Studies were made of the effect of frond applications of 4-CPA on the rhizomes of P. aquilinum. Changes in internal structure were studied in sections cut from the apical 1 cm rhizome branches of unit plants grown from sporelings or fragments of mature rhizomes and stands of field bracken. The amount of lignified tissue in rhizomes increased considerably after treatment, and at higher (unspecified) concentrations of 4-CPA, resulted in the production of swollen, irregular apices, which split and later decayed. Spraying young fronds at the end of June caused more scorching, but less damage to rhizome buds than did spraying in mid August. An analysis of the rhizome system showed that a higher percentage of frond buds were found on branches without expanding fronds than on branches with expanding fronds. Both the fronds and their rhizome tips were only partially damaged by 4-CPA; in the years following spraying, these may be expected to form frond populations relative to the extent of frond-bud reserves. Mechanical defoliation was shown to be ineffective. - M.G.G. [O.W.]

1438. O'NEILL, J.M. (Dep.Agric.,Adelaide, S.Australia). Which plant is skeleton weed? J.Agric.S.Aust., 1961, 65,(1),18-22, figs.9.
Chondrilla juncea is described and illustrated, and drawings of other similar plants are included to aid identification. D.M.L.S. [O.W.]

1439. TIDEMAN, A.F. (Dep.Agric.,Gawler Place,Adelaide,S.Australia). Skeleton weed - bane or blessing? J.Agric.S.Aust., 1961, 65,(1),14-17,(illus.).
The problem and distribution of Chondrilla juncea in S. Australia is outlined. Under S. Australian conditions the use of subterranean clover for its control is impossible and the value of using barrel and burr clovers and lucerne is limited and gives only partial control. Fallow spraying is not recommended. Best results are obtained with 2,4-D (amine) 0.75 # applied when the centre stem is growing away from the rosette. Spot-spraying after harvest with 2,4-D amine or ester 0.2% is useful in limiting the spread and preventing seed-set. The following are recommended as soil sterilants: Borascu [sodium tetraborate 93%] where rainfall is greater than 13-15 in.) 8 lb/100 sq. ft, Polybor chlorate [sodium pentachlorate 59%, borax 15.25%, sodium chlorate 25%] 3.5 lb/100 sq.ft, sodium chloride, Atlacide [sodium chlorate] 1 lb/gal, as a soil drench, and MCPA 2 fluid oz of liquid concentrate/sq.ft. - D.M.L.S. [O.W.]

1440. CAMPBELL, M.H. (Exp.Farm,Bathurst, New South Wales,Australia). Burning aids in the control of serrated tussock. Agric. Gaz.N.S.W., 1961, 72,(6),311-13,(illus.).
The following procedure is advised for the control of Nassella trichotoma: burn in late winter, followed by discing or mouldboard ploughing as soon as possible after, disc harrow in early summer, allow a summer fallow, and disc harrow again before sowing in autumn. Burning kills 96% of seed present in the seed heads, but seed which falls before burning remains viable despite the fire.
Burning in late autumn and winter prevents seeding; it is most effective when done against the prevailing wind and when there is no dew on the ground. Burning in spring and autumn are much less effective in preventing seed production.
Burning 1 month after herbicide application in January or May, or immediately before spraying in May, increases the efficacy of herbicides. Complete kills have been

obtained by applying dalapon 5 # in August and burning 1 month later; when not followed by burning, kill was not achieved even by dalapon at 20 #. Repeated burning, or burning 9 months before sowing, aids clover establishment after aerial sowing on infested ground. - D.M.L.S. [O.W.]

1441. * RZEDOWSKY, J. Salsola kali var. tenuifolia, una peligrosa maleza exotica que esta extendiendose hacia el centro de Mexico. [Salsola kali, var. tenuifolia, a dangerous exotic weed which is spreading into the centre of Mexico.] Soc.Bot.de Mex.Bull., 1959, 24,53-9.

1442. NORTH CAROLINA AGRICULTURAL EXTENSION SERVICE. Crotalaria. Friend turned foe. Ext.Folder N.C.agric.Ext. Service, 1960, 186,pp.5.

Sowing Crotalaria striata and C. spectabilis is not recommended because of the danger of contamination of feed grains with the seeds of these species, the difficulty of controlling volunteer plants in soybeans, and the limited knowledge of their reaction to herbicides. Possible, though less efficient, substitutes suggested are soybeans and cowpeas on sandy soils and velvet beans (Stizolobium sp.),(summer annuals), winter annuals such as hairy vetch and common vetch and lupins, or perennials such as coastal Bermuda grass (Cynodon dactylon), Lespedeza cuneata, Bahiagrass (Paspalum notatum) or weeping lovegrass (Eragrostis curvula). Field practices recommended for controlling Crotalaria are: (a) use of simazine, atrazine, diuron or fenac, (b) repeated cultivation early in the season, (c) cultivation, plus the application of 2,4-D amine broadcast 0.25 and 0.5 # for maize 3 to 4 in. and 4 to 12 in. tall, respectively, and for maize 12 to 24 in. tall, 2,4-D 0.5 # as a directed spray, (d) nitrogen solution + 2,4-D spray applied to clean maize crops when 20 to 30 in. tall. No chemical is yet available for controlling Crotalaria in soybeans. - M.G.G. [54(75.6)]

1443. HOLT, E.C., ALLEN, W.W. and LONG, J.A. (Texas Agr.Exp.Sta.,College Station,Texas, U.S.A.). EPTC retards growth of nutgrass tubers. Crops and Soils, 1961, 13,(8),27.

The results of 2 years' trials in Texas on the control of nutgrass [Cyperus rotundus] are briefly reviewed. Soil incorporation of EPTC was more effective in killing C. rotundus tubers than equal rates of the emulsifiable formulation applied to the surface and then leached into the soil. Emergence of C. rotundus was inhibited for 6-16 weeks when EPTC 4, 8, 12 and 16 #, respectively, was incorporated into the soil before the tubers were planted. Tuber sprouting was not completely inhibited even with the higher rates of EPTC, but the shoots failed to emerge in most cases. Many tubers which had remained for 10-12 weeks in soil treated with high rates of EPTC failed to sprout when transplanted into clean soil; a number of tubers eventually emerged both from treated soil and after transplanting into untreated soil. Bermuda grass [Cynodon dactylon] was inhibited or reduced by EPTC for a longer period than C. rotundus. - J.L.M. [O.W.]

1444. STEPHENS, D. (Kawanda Research Station, Kampala,Uganda). Observational trials on the control of Oxalis semiloba Sond. with herbicides. Pest.Abstr.News Summary C., 1961, 7,(2/3),77-81, tabs.1, bibl.3.

Amitrole (as "Amizol") 5 # applied in October gave good control of O. semiloba and increased the yield of beans sown 18 days later, compared with those from hand-weeded plots; 2.5 # was slightly less effective. When applied in a mixture with ammonium thiocyanate (as "Weedazol TL"), or with PCP 10 and 20 #, or when applied after slashing, results were greatly inferior. The following were ineffective: simazine 2.5-10 # after slashing, MH 5-20 #, and EPTC 3-12 # after hoeing. The following were less effective than amitrole: AMS 25-100 #, monuron 4-16 # after slashing, 2,3,6-TBA 2.5-10 # ± MCPA 0.5-2 #, and fenac (which was the next best after amitrole) 2.5-10 #. - D.M.L.S. [O.W.]

CHEMISTRY, PHYSICS, TOXICOLOGY, RESIDUES AND SOILS.

1445. MARQUARDT, R.P. and LUCE, E.N. (The Dow Chemical Co.,Midland,Michigan, U.S.A.). A new basic procedure for determining phenoxy acid herbicides in agricultural products. J.agric.fd Chem., 1961, 9,(4),266-70, figs.3,tabs.3,bibl.4.

An improved analytical method for the determination of residues of phenoxy acids and their esters or salts is described. The acid is first extracted, 2,4-D with

chloroform and fenoprop with carbon tetrachloride; the ether linkage is then split by pyridine hydrochloride, and the resultant phenol derivatives are determined spectrophotometrically. Full practical details are given. - J.L.M. [O.W.]

1446. *RITZERT, R.W., SELL, H.M. and BUKOVAC, M.J. (Michigan State Univ., East Lansing, U.S.A.). Synthesis and biological activity of several ethyl 1-acylindole-3-acetates. Plant Physiol., (Suppl.), 1961, 36, vii, (Abstract).

1447. MOSZEW, J. and WACHALEWSKI, T. Synthetic plant-growth controllers. 6. Benzyl derivatives of 1-naphthylacetic acid. Rocz.Chem., 1960, 34, 1387-96.
The preparation of (a) 4-benzyl- and (b) 2-benzyl-1-naphthylacetic acid from 1- and 2-benzylnaphthalene, respectively, is described. Taking the activity of 2,4-D (0.1% concentration) as 100, that of (a) is 90 and 100 and of (b) 15 and 30, as tested with flax and mustard, respectively. From J.Sci.Fd Agric., 1961, 12, ii-97. - P.J.B.

1448. CROSBY, D.G. and BERTHOLD, R.V. (Union Carbide Chemicals Co., S.Charleston, W.Virginia, U.S.A.). n-Butyl 5-chloro-2-pyrimidoxyacetate - A plant growth regulator analog. J.Org.Chem., 1960, 25, 1916-19, figs.2, tabs.2, bibl.24.
n-Butyl 5-chloro-2-pyrimidoxyacetate, in which the possibility of reaction at the position ortho to the side chain was negligible, was prepared as an analogue of 4-CPA to provide a further test of the present theories concerning relation of structure to plant growth stimulation. Although very similar in shape and physical properties to 4-CPA, it was inactive. As other analogues, 2-pyridoxyacetic acid and 3,5-dichloro-2-pyridoxyacetic acid, in which the hydride or chloride ortho to the side chain could be displaced by a cellular nucleophilic agent, were shown earlier to stimulate growth, the availability of this position towards nucleophilic substitution is suggested to bear an important relation to growth stimulation. - M.G.G. [11(75.4)]

1449. MATOLCSY, G., HAMRAN, M. and VEGH, A. (Res.Inst.for Pl.Protect., Budapest, Hungary). Synthesis, herbicide and fungicide effects of some new s-triazine derivatives. Acta Agron., Acad.Sci.Hung., 1960, 10, (3-4), 409-13, (E.g.russ.), tabs.1, bibl.6.
The herbicidal and fungicidal activity of a number of triazines containing dithiocarbamate, xanthogenate and rhodanid radicles was investigated. Wheat, rape and maize seed was sown in pots in soil containing 0.1 mg of the different compounds per kg soil. The most active growth-inhibiting effect was shown by 2-chloro-4-dimethylthiocarbamyl mercapto-6-dimethylamino-s-triazine. A symmetrical dimethyldithiocarbamate derivative exercised a notably selective action against rape. P.J.B. [15(439)]

1450. WORLD CROPS. Granular herbicide. World Crops, 1961, 13, (9), 365.
Reports the manufacture by Chipman Chemical Co. Ltd., of "Chlorea Granular" a total herbicide containing sodium chlorate, sodium borate, 2,4-D and monuron, formulated in pellet form. - D.M.L.S. [O.W.]

1451. JANSEN, L.L. (Agric.Res.Serv., U.S.Dep.Agric., Beltsville, Maryland, U.S.A.). Physical-chemical factors of surfactants in relation to their effects on the biological activity of chemicals. Proc.4th internat. Conf.Plant Growth Regulation 1959, 1961, 813-16, figs.1, bibl.2.
Emphasis is laid on factors other than surface tensions which may affect the biological activity of systems containing surfactants. - C.C.McC. [O.W.]

1452. EDSON, E.F. Applied toxicology of pesticides. Pest.Abstr.News Summ. A, 1961, 7, (2/3), 233-45, bibl.21.
Aspects reviewed include the hazards entailed by the use of toxic chemicals in agriculture, measures for controlling the use of pesticides in Gt Britain, deaths in Gt Britain following the use of pesticides, and the prevention of hazards in the practical use of pesticides. Tables give the comparative hazards of different classes of pesticides and the acute single-dose LD_{50} value of a number of herbicides. P.J.B. [O.W.]

1453. FLETCHER, W.W. (W.of Scotland Agric.Coll., Glasgow). Effect of organic herbicides on soil micro-organisms. Pest Technol., 1961, 3, (12), 272-5, bibl.31.
The effects of the following herbicides and other materials on the micro-organisms of soil are reviewed briefly: amitrole, CDEA, CDAA, chlorpropham, propham, dalapon, dinoseb, DNOC, MH, PCP, TCA, substituted

phenoxy acids and surface active agents and emulsifiers. See also Weed Abstr. 10:159. P.J.B. [O.W.]

1454. KRETSCHMER, H. Über die Zersetzung von Chlorat-Herbiziden in Grabenschlamm. [The decomposition of chlorate herbicides in the mud of ditches.] Albrecht-Thaer-Archiv, 1961, 5,(3),236-7, bibl.2.

Experiments were carried out in 1960 to determine the rate and degree of decomposition of three chlorate herbicides, anforstan (68.1% ClO_3), agrosan (78.4% ClO_3), and wegerein (79.5% ClO_3), mixed in the ratio 1:2000 with samples of muddy soil from ditches. The samples were tested for chlorate content and pH value at intervals, after either simulated rainfall treatment in the laboratory, or exposure to normal weather conditions in the field over periods of 20-60 days. There was no significant change of pH during the trial period and little difference between the pH value of the treated and control samples. Decomposition of chlorates began after 16 hours, and after 2 days showed a 2-3% reduction, while at 60 days the chlorate content in samples treated with anforstan, wegerein, and agrosan was reduced by 63%, 78%, and 94%, respectively. No detectable amounts of chlorate or chlorine were absorbed by the soil, and it was concluded that decomposed herbicidal fractions must enter the water carried within the ditch. - J.L.M. [283(43)]

1455. MASSINI, P. (Philips Res.Labs, N.V.Philips' Gloeilampenfabrieken, Eindhoven, Netherlands). Movement of 2,6-dichlorobenzonitrile in soils and in plants in relation to its physical properties. Weed Res., 1961, 1,(2),142-6,(E.g.f.), figs.7,tabs.1,bibl.6.

The movement of 2,6-dichlorobenzonitrile-(nitrile-^{14}C) [2,6-DBN] in soils and plants is governed by its relatively high volatility, low solubility and strong adsorption on lignin, humic matter (plant stems and potting soil) and lipid material (including chloroplasts). Studies were made of adsorption on various organic substances, plant fractions and soils. Percolation and diffusion was rapid through sand and slow through potting soil. Uptake and translocation were studied in *Phaseolus vulgaris*, *Solanum lycopersicum* [*Lycopersicon esculentum*], *Cucumis sativus* and *Avena sativa*. 2,6-DBN was taken up from the atmosphere by all organs, and from aqueous solution by roots or cut stems. Transport was in the transpiration stream, but moved more slowly owing to the affinity of 2,6-DBN for lignin. When taken up by the leaf epidermis it moved very slowly upwards. Some evidence for the metabolism of 2,6-DBN in the plant is presented. - M.G.G. [O.W.]

1456. BARNSLEY, G.E. and ROSHER, P.H. (Woodstock Agric.Res.Centre, Sittingbourne, Kent). The relationship between the herbicidal effects of 2,6-dichlorobenzonitrile and its persistence in the soil. Weed Res., 1961, 1,(2),147-58,(E.f.g.), figs.1,tabs.6,bibl.2.

A series of experiments with 2,6-dichlorobenzonitrile (2,6-DBN) in England and the W. Indies are described. It was shown in temperate glasshouse trials to be highly phytotoxic to the temperate crops oats, maize, peas, sugar-beet, oil-seed flax, kale, mustard and *Lolium perenne*, at 0.5, 1, 2, 4 and 8 # pre-em. or as a soil drench 2 to 3 weeks after emergence. 2,6-DBN acted predominantly through the roots but at high temperatures entered the leaves in the vapour phase. Of the crop plants and weeds used in glasshouse trials under tropical conditions, deccan hemp (*Hibiscus cannabinus*), maize, groundnuts, sorghum and pigeon pea (*Cajanus cajan*) showed useful tolerance to 2,6-DBN at 0.5, 1, 2, 4 and 8 # applied pre-em., and watered in. Crop and weed response in the field and the quantitative assimilation of chemical residues in soils were determined. In temperate conditions 2,6-DBN at 3 # was sprayed in October on plots, of which, half of each was cultivated. Persistance was determined by planting bulbs of tulip, narcissus and daffodil 0, 4, 8, 16 and 32 days after spraying and by bioassays with Avena coleoptiles. A 90 to 100% reduction in fresh weight and number of blooms was recorded from all plots where the spray was incorporated in the soil. Bulbs planted 8 days or more after the plots were sprayed and the spray was not incorporated, showed $<25\%$ reduction in fresh weight and number of blooms. Under tropical conditions maize, groundnuts, and sorghum were sown at different times and treated with all combinations of 2,6-DBN at 0.5, 1, 2, 3 and 4 # ± simulated rainfall, ± raking in. Four days delay between planting and treatment significantly reduced crop damage. Persistence of 2,6-DBN following applications to the soil surface was short under both conditions, but was extended from a few days to several weeks if incorporated immediately after application. Most loss occurred in the first few days from the

top 3 in. of soil. No downward leaching occurred but the herbicide underwent slow microbiological breakdown. Under tropical conditions the effect of 4 # applied to the surface was roughly equal to 2 # watered in immediately, 1.5 # raked in or 1 # watered and raked in. A delay of 4 hours between application and incorporation reduced the effectiveness of 2,6-DBN by half. The lack of persistence of the herbicide when applied to the soil surface, and the modifying influence of soil incorporation and watering is attributed to its high vapour pressure (5×10^{-4} mm Hg at 20°C) and its relatively low solubility in water (20 p.p.m. at 25°C). - M.G.G. [O.W.]

APPLICATION AND MACHINERY

See also 1367

1457. SOMERS, E. (Long Ashton Res.Sta., Univ.Bristol,England). Effect of formulation on the biological efficiency of pesticides. Soc.Chem.Ind.inst.,Rpt.Prog. Appl.Chem., 1959, 44,311-26, bibl.103.
A review, almost entirely devoted to insecticides, especially DDT, and fungicides. Includes observations on the effects of diluents, surface-active agents, stickers and on dispersible powders and emulsions. P.J.B. [475(42)]

1458. FISONS PEST CONTROL, LIMITED. Lovo spray formulants. Publ.Fisons Pest Control, Ltd., [n.d.], pp.12.
"Lovo" formulants are based on amine stearates, which produce a film of stearic acid round each spray droplet by evaporation of the volatile amine base. These formulants are intended for use with very low volume (1 to 2 gal/ac) sprays of insecticides and fungicides applied from aircraft, or by drift spraying or mist blowing. They retard the evaporation of water droplets before reaching the crop, increase spray retention on surfaces difficult to wet and increase the resistance of spray deposits to removal by rain. The formulants can be used with any insoluble, solid active ingredient required to be applied in very low volumes in water. - M.G.G. [O.W.]

1459. JANSEN, L.L., GENTNER, W.A. and SHAW, W.C. (U.S.Dep.Agric.,Beltsville, Maryland,U.S.A.). Effects of surfactants on the herbicidal activity of several herbicides in aqueous spray systems. Weeds, 1961, 9,(3),381-405, figs.6,tabs.2,bibl.31.
An experimental technique for the evaluation of the effects of surfactants (surface-active agents) was developed. Sixty-three surfactants, representative of anionic, cationic, non-ionic, ampholytic, and blended-surfactant classes, were evaluated in the glasshouse for effects on the herbicidal activity of water-soluble forms of dalapon, 2,4-D, dinoseb, and amitrole. Two representative test species, maize and soybean, were used. A polyoxyethylene sorbitan monolaurate, S-145, was included as a reference standard in all experiments.
Surfactants exhibited 3 characteristic types of action on herbicidal activity. Most commonly, progressive enhancement of herbicidal activity was obtained with logarithmic increases in surfactant concentrations. Some surfactants brought about progressive suppression of the herbicidal activity, and still others were ineffective in changing the level of activity attributable to the herbicide alone. Many surfactants showed marked inherent phytotoxicity at higher concentrations, and some stimulated growth at low concentrations in the absence of herbicides. Surfactant effects were not necessarily the same on both species, with all herbicides, or at all initial levels of herbicidal activity. No correlation was found between any one of the effects of a surfactant and the ionogenic class to which the surfactant belonged.
Principal results obtained in glasshouse experiments were confirmed under field conditions.
The possible applications of surfactants to future weed control research are discussed. Authors' summary. [115(75.2)]

1460. DAY, B.E. and JORDAN, L.S. (Univ. Calif.Citrus Exp.Sta.,Riverside,U.S.A.). Spray retention by bermuda grass. Weeds, 1961, 9,(3),351-5, figs.2,bibl.3.
The amount of liquid required to wet stands of *Cynodon dactylon* was determined by dipping samples of the grass in water and in solutions of sodium dioctylsulfosuccinate, a surfactant. Retention was greatest for distilled water and for low concentrations of surfactant and decreased by about one fourth as surfactant concentration was increased from 0.01 to 0.16%. Distribution of water on the shoots was significantly more uniform when surfactant was present. In 4 populations of *C. dactylon* studies, retention of 0.01% solutions of surfactant ranged from 247-536 gal/ac, with wide variations in the proportion of the liquid held by the green

leaves, green stems and dead tissues. Authors' summary. [O.W.]

1461. COURSHEE, R.J. (Nat.Inst.Agric. Engng,Wrest Park,Silsoe,Bedfordshire,England). Experiments on the subjective assessment of spray deposits. J.agric.Engng Res., 1961, 6,(3),175-82, figs.3,tabs.7,bibl.7.
Errors in relative subjective assessments of visible spray deposits were measured and the results indicated that 80% of several hundred subjective assessments were wrong by less than 15%. A method of using relative subjective assessments to provide absolute estimates of deposit density on numerous samples is described. From Author's summary. P.J.B. [O.W.]

1462. CARTER, L.M., COLWICK, R.F. and TAVERNETTI, J.R. (Univ.California,Davis, U.S.A.). Evaluating flame-burner design for weed control in cotton. Trans.Amer. Soc.Agric.Eng., 1960, 3,(2),125-8, figs.6, tabs.2,bibl.8.
In trials during 4 years flame patterns, settings, fuel consumption rate, and their relation to damage to weeds and crop tolerance were studied and the value of flame control of weeds in cotton assessed. A variety of flame burners were tested and a comparison made of two similar vapour-type burners, (a) the Stoneville, incorporating a 0.5 in. by 5.5 in. flame opening with a double-orifice fan spray nozzle, and (b) the Arkansas, which is of similar design, but having a horizontal combustion chamber with a 30° angle deflector. Such weed control as a supplement to chemical methods is most effective in mid and late season on cotton plants 8 in. high. Best results were obtained by flaming at a height of 8-10 in. from the ground, with the burner inclined at 30°. Consumption rates are generally fixed at 1.5-4.6 gal/hour, at a pressure of 30-60 p.s.i., to produce a flame thickness of ca. 2.5 in. Maximum working temperature of the flame was 2400-2600° at 6-8 in. from the burner tip. Cotton plants 8 in. high tolerated exposure to flame for 6.1 seconds when fuel rates varied between 1.5 and 3.33 gal/hour at a tractor speed of 3 m.p.h. No difference in crop damage for the Arkansas and Stoneville burners was found. - J.L.M. [222(79.4)]

1463. AGRICULTURAL RESEARCH. Laboratory tests and waterweed research. Agric.Res. (Wash.), 1961, 10,(2),11.
P.A. Frank, N.E. Otto and T.R. Bartley, working at Denver, Colorado, have used the following devices for research on herbicides for waterweed control: (1) for weeds in standing water, the potted weeds are placed in large jars filled with herbicide solution, (2) for weeds in flowing water, the potted weeds are placed for 30 minutes in a trough fitted with 2 sump pumps which circulate the herbicide solution; they are then removed, rinsed and placed in jars filled with water. - D.M.L.S. [O.W.]

1464. COURSHEE, R.J. (Nat.Inst.Agric.Engng, Silsoe,Bedfordshire,England). Aircraft for agriculture. I. The economics of agricultural aviation. World Crops, 1961, 13,(9),335-8,(illus.), figs.3,tabs.2, bibl.3.
With reference to its use in Britain. A formula for assessing the cost is given. D.M.L.S. [O.W.]

1465. COURSHEE, R.J. (Nat.Inst.Agric. Engng.,Silsoe,Bedfordshire,England). Airspray nozzles. Agric.Aviation, 1961, 3,(1),9-12, figs.4,bibl.5.
The following 3 main types of nozzles which are fitted to fixed-wing aeroplanes are described: hydraulic nozzles (usually of the swirl type), air-blast nozzles and rotating nozzles, (the last-mentioned is not normally fitted to helicopters). The problem of spray distribution is also discussed. - J.W.F. [O.RE.]

1466. HOSCH, L. (PflSchAmt.,Hannover, Germany). Ein Reihenspritzgerät für die Unkrautbekampfung in Zuckerrübenbau. [A row-spraying apparatus for weed control in sugar beet.] Gesunde Pflanze, 1961, 13,(3),79-84, figs.2.
Describes a band sprayer and its performance during trials in 1960. Each 1.8 mm spray nozzle was mounted 25 cm behind the coulters of the seed drill and delivered 1.33 l alipur (6.5% OMU, 26% BiPC) in 200 l spray volume at a rate of 0.9 l/minute at 2 atmospheres pressure. With 5 mounted spray nozzles, 4.5 l of herbicide covered 100 m of row length/minute at a tractor speed of 6 km/hour. The weed stand in the treated rows was reduced to 25-33% of that on control plots. - J.L.M. [O.W.]

1467. SEANEY, R.R. and SCHREIBER, M.M. (Coll.Agric.,Cornell Univ.,Ithaca,New York

State,U.S.A.). Shield-spraying of herbicides for space-planted forage legume nurseries. Agron.J., 1960, 52,(12),719, figs.3.
Shields, of metal or canvas, which can be mounted on a tractor to protect crop plants when spraying herbicides between the rows, are described and illustrated. - J.W.F. [O.RE.]

PHYSIOLOGY, MORPHOLOGY AND ANATOMY

See also 1455

1468. KEFFORD, N.P. and GOLDACRE, P.L. (Div.Pl.Industry,C.S.I.R.O.,Canberra, Australia). The changing concept of auxin. Amer.J.Bot., 1961, 48,(7),643-50, bibl.64.
An interpretation is given of recent findings in research on auxins. It is proposed that auxin is an agent predisposing to cell changes in plants and it is proposed that its function in intact plants is as follows: from the zones of synthesis of auxin, it is distributed to different parts of the plants by means of the auxin transport system. For cells to react to the arrival of auxin, other classes of plant growth regulator must be present, thus auxin interacts with gibberellin to control cell enlargement and with Kinin in initiating cell division. The role of auxin in cell and tissue differentiation is discussed, as is the use of biological assay for auxins, with reference both to natural auxins and to the fact that the primary auxin reaction is not yet known. It is pointed out that if transport is a necessary requirement of a native auxin, indole-3-acetic acid is, at present, the only substance known to qualify. - P.J.B. [O.W.]

1469. van OVERBEEK, J. (Shell Development Co.,Modesto,California,U.S.A.). New theory on the primary mode of auxin action. Proc. 4th internat.Conf.Plant Growth Regulation 1959, 1961, 449-55, figs.2,bibl.10.
A possible mode of attachment of the auxin molecule to the cytoskeleton is discussed in stereochemical terms. - C.C.McC. [O.W.]

1470. FREED, V.H., REITHEL, F.J. and REMMERT, L.F. (Oregon State Coll., Corvallis,U.S.A.). Some physical-chemical aspects of synthetic auxins with respect to their mode of action. Proc.4th internat. Conf.Plant Growth Regulation 1959, 1961, 289-303, figs.2,tabs.6,bibl.38.
The theory is advanced that the primary event in the mechanism of action of the chlorophenoxyacetic acids is adsorption on a protein surface, and that as a consequence the structure of the protein is modified in such a way as to change its enzymatic activity. This view is supported by a discussion of data, in part original, on the effects of growth regulators on cytoplasmic viscosity and streaming, the surface activity of growth substances, their effects at high concentrations, their ultra violet and infra red absorption spectra, their water solubility, their adsorption to proteins and mitochondria, and the effects of 2,4-D on the structure of the perioxidase molecule. C.C.McC. [O.W.]

1471. KEY, J.L. (Univ.California,Davis, California,U.S.A.). The relationship of ascorbic acid to the growth regulating action of auxin. Plant Physiol.(Suppl.) 1961, 36,xii,(Abstract).
The results are reported of studies of the effect of treatment with a wide range of growth regulators on the ascorbic acid content of cucumber plants. Treatment of the plants resulted in the inhibition of further leaf growth and apical meristem activity, in association with increased expansion and cell division in the stem tissue. In response to auxin treatment, the ascorbic acid content in inhibited leaf tissue fell markedly and increased considerably in stem tissue in which promotion of growth had occurred. There was a close correlation between ascorbic acid response and the activity of the chemical used. P.J.B. [O.W.]

1472. GALSTON, A.W. and KAUR, R. (Yale Univ.,New Haven,Connecticut,U.S.A.). The intracellular locale of auxin action: an effect of auxin on the physical state of cytoplasmic proteins. Proc.4th internat. Conf.Plant Growth Regulation 1959, 1961, 355-62, figs.1,tabs.5,bibl.10.
When 2,4-D promoted the growth of etiolated and green pea epicotyl sections, no evidence could be found for the attachment of the 2,4-D to any particulate fraction in the cells. 2,4-D greatly decreased the coagulability by heat of the cytoplasmic proteins without affecting the total protein content. It is suggested that this effect is connected with the promotion of growth. - C.C.McC.[O.W.]

1473. BALLANTYNE, D.J. (Univ.Maryland,

College Park,U.S.A,). Growth regulators and the flowering of evergreen azaleas (Rhododendron Cv.). Ph.D.Thesis Univ. Maryland, 1960, pp.79, Microfilm $2.75, Xerox $4.20.
The results are given of experiments on the effect of potassium gibberellate, gibberellic acid, 2,3,5-triiodobenzoic acid and indole acetic acid, in combination with storage at 37°F and 45°F for 2 or 4 weeks before treatment, on multiple bud formation and rate of flower bud formation in evergreen azaleas. From Diss.Abstr.21,(10),2843. - J.W.F.

1474. DYAR, J.J. and WEBB, K.L. (Ohio State Univ.,Columbus,U.S.A.). A relationship between boron and auxin in C^{14} translocation in bean plants. Plant Physiol., 1961, 36,(5),672-6, bibl.23.
The relationship between boron and auxin is considered and the suggestion is revived that boron is essential to auxin metabolism and, possibly, synthesis. - P.J.B. [O.W.]

1475. MITCHELL, J.W., LINDER, P.J. and ROBINSON, M.B. (U.S.Dep.Agric.,Beltsville, Maryland,U.S.A.). Root exudation of alpha-methoxyphenylacetic acid. Plant Physiol., (Suppl.), 1961, 36,xxxiv,(Abstract).
^{14}C-labelled alpha-methoxyphenylacetic acid (MOPA) was absorbed by the leaves of bean plants, translocated to the roots and exuded without detectable chemical change into aerated water in which the roots were held. Exudation of MOPA was proportional to the amount applied to the leaves over a dosage range up to 40 times that required to bring about a barely detectable amount of root exudation. With MOPA, 20% of that applied to the leaves exuded from the roots, compared with only 3% for ^{14}C-labelled 2,4-D. - P.J.B. [O.W.]

1476. KATO, J. (Univ.Kyoto,Japan). Physiological action of gibberellin with special reference to auxin. Proc.4th internat.Conf.Plant Growth Regulation 1959, 1961, 601-9, figs.5,tabs.3,bibl.31.
From experiments on the elongation of etiolated pea stem sections it is concluded that gibberellin is a growth-promoting substance quite different in nature from auxin; its growth effect is not due to a change in auxin level of the affected tissue; and the reaction site of gibberellin in plant tissues is different from that of auxin. - C.C.McC. [O.W.]

1477. GRUCH, W. Symposium über Gibberelline. [Symposium on gibberellin.] NachrBl. dtsch.PflSchDienst,Braunschweig, 1961, 13, (7),108-9.
Among the properties and action of gibberellin discussed at a symposium held at Giessen in 1960 were steric configuration and oxidative phosphorylisation. J.L.M. [O.W.]

1478. AUDUS, L.J. and BAKHSH, J.K. (Bedford Coll.,Univ.London,England). On the adaptation of pea roots to auxins and auxin homologues. Proc.4th internat. Conf.Plant Growth Regulation 1959, 1961, 109-24, figs.4,tabs.1,bibl.8.
Includes the observation that subapical segments from pea roots grown either in indole-3-acetic acid or in 2,4-D showed reduced sensitivity to the growth-inhibiting effects of both auxins. - C.C.McC. [O.W.]

1479. ANDREAE, W.A. and van YSSELSTEIN, M.W.H. (Canada Dep. Agric. Pesticide Res. Inst.,London, Ontario, Canada). Root growthinhibition following IAA and 2,4-D treatment. Plant Physiol.(Suppl.) 1961, 36, xl. (Abstract).
Pea root tips were incubated for 16 hours in radioactive indole-3-acetic acid (IAA) and 2,4-D solutions. 2,4-D, but not IAA, accumulated in the tissues and growth remained inhibited after treatment with 2,4-D, but not after IAA. Washing 2,4-D-inhibited tissues removed both the accumulated 2,4-D and the growth inhibition. P.J.B. [O.W.]

1480. ÅBERG, B. (Roy.Agric.Coll., Uppsala, Sweden.) Some new aspects of the growth regulating effects of phenoxy compounds. Proc.4th internat.Conf.Plant Growth Regulation 1959,1961,219-30,bibl.19.
Data are given for growth regulating effects on oat coleoptile cylinders, wheat roots and flax roots of 79 phenoxy derivatives. Many of these could simply be classified as auxins or anti-auxins, but showed an intermediate character. - C.C.McC. [O.W.]

1481. * HANSCH, C. and MUIR, R.M. (Pomona Coll..Claremont, California). Electronic effect of substituents on the activity of phenoxyacetic acids. Proc.4th internat. Conf.Plant Growth Regulation 1959,1961, 431-43, tabs.1,bibl.40. [O.W.]

1482. OSBORNE, D.J. and HALLAWAY, M. (Dep.Agric.,Univ.Oxford,England). The role of auxins in the control of leaf senescence. Some effects of local applications of 2,4-dichlorophenoxyacetic acid on carbon and nitrogen metabolism. Proc.4th internat.Conf.Plant Growth Regulation 1959, 1961, 329-38, figs.3, tabs.1,bibl.6.

When 2,4-D was applied to parts only of attached Euonymus japonica leaves, the treated areas remained green while the surrounding tissues yellowed. Discs cut from the treated areas showed a higher rate of oxygen uptake than those from untreated areas or control leaves. Carbon compounds either moved into or were preferentially retained in treated areas. Analyses indicated that nitrogenous compounds accumulated in treated areas, and experiments on excised leaves confirmed that soluble nitrogen moved from untreated to treated areas. Treated cells have a high rate of metabolism and no net protein breakdown; they seem to act as metabolic sinks to which nitrogen and possibly carbon materials are drawn from the surrounding cells, resulting in premature senescence in the untreated parts of the leaf which contain only a relatively low concentration of the applied auxin. - C.C.McC. [O.W.]

1483. BASLER, E., TODD, G.W. and MEYER, R.E. (Oklahoma Agric.Exp.Sta., Stillwater,U.S.A.). Effects of moisture stress on absorption, translocation, and distribution of 2,4-dichlorophenoxyacetic acid in bean plants. Plant Physiol., 1961, 36,(5),573-6, figs.3,tabs.1,bibl.17.

Bean (Phaseolus sp.) plants were grown in pots and, to give different degrees of moisture stress, were deprived of water 1, 2 or 3 days before treatment of the leaves with 2,4-D-2-^{14}C and left without water for the remainder of the experiment. In another experiment, plants were subjected to water deprivation for 3 days, and were then treated with 2,4-D-2-^{14}C at 0, 1.5, 5, 12 or 24 hours after restoration of the water supply. Translocation and absorption of 2,4-D were determined 5 hours after application in both experiments. The relative turgidity of the leaves was closely correlated with the ability of the plants to translocate 2,4-D; those with relative turgidities of $<80\%$ translocated only trace amounts. While increases in turgidity above this value were accompanied by sharp increases in the amount translocated. Moisture stress appeared to have little influence on the amount of 2,4-D absorbed by the leaves. Plants subjected to 3 days' drought recovered turgidity within 1-2 hours after restoration of the moisture supply, but took several hours to regain their ability to translocate 2,4-D in significant amounts. - P.J.B. [O.W.]

1484. BACH, M.K. (Res.Dep.,Union Carbide Chem.Co.,South Charleston,W.Virginia,U.S.A.). Metabolites of 2,4-dichlorophenoxyacetic acid from bean stems. Plant Physiol., 1961, 36,(5),558-65, figs.6,tabs.3,bibl.19.

Bean (Phaseolus vulgaris) stems from plants 4 weeks old were cut into 6 in. lengths and infiltrated with a 2% sucrose solution containing 10^{-4} M 2,4-D-1-^{14}C (2-22 mc/mmole), before incubation for 3 days in darkness. After incubation, the stems were extracted with acetonitrile and ether. One half of the original radioactivity present was found in 10 components of the ether extract. Of the 10 fractions, 60% of the total radioactivity was present in one and a second fraction accounted for a further 20%. All 10 components retained the aromatic nucleus of 2,4-D. Some possessed phenol and alcohol groups, but there was no evidence of aliphatic unsaturation. Neither 2,4-D or 6-hydroxy-2,4-D were isolated. The ether-insoluble fraction contained at least 6 major components. Two were identical with two major components of the ether-soluble extract. In addition, some 10 amino acids were also isolated and 7 identified. From the results, it was postulated that the 2,4-D side chain is lengthened in the course of 2,4-D metabolism. The significance of this as a pathway to detoxification of 2,4-D is noted. - P.J.B. [O.W.]

1485. BACH, M.K. and FELLIG, J. (Union Carbide Chemicals Co.). The uptake and fate of C^{14}-labeled 2,4-dichlorophenoxyacetic acid in bean stem sections. Proc.4th internat.Conf.Plant Growth Regulation 1959, 1961, 273-87, figs.5,tabs.2,bibl.27.

Exposure to 10^{-4} M 2,4-D for 4 hours was sufficient to initiate extensive collus formation in bean-stem sections incubated on nutrient agar. The uptake of 2,4-D during this period was dependent on the concentration supplied and on the area exposed. No clear-cut difference between the various internodes of young bean plants could be demonstrated, nor could a difference in uptake from the apical or basal end of the stems be shown.

After apical application of 1-^{14}C-2,4-D to the stems, the peak of radioactivity was

localised at a few mm below the point of application and travelled down with time. The width of the peak increased markedly at longer exposures. Apical application of unlabelled 2,4-D accelerated the disappearance of radioactivity from stems which had previously been exposed to ^{14}C-2,4-D, although the location of the peak of radioactivity remained essentially unchanged. Decarboxylation and release of $^{14}CO_2$ appear to be a minor path in the metabolism of 2,4-D by the bean stems. Most of the radioactivity was recovered in the form of a complex of unknown structure which was inactive in causing callus formation, but which yielded 2,4-D upon acid hydrolysis. - C.C.McC. [O.W.]

1486. BLACKMAN, G.E. (Dep.Agric.,Univ. Oxford,England). A new physiological approach to the selective action of 2,4-dichlorophenoxyacetic acid. Proc.4th internat.Conf.Plant Growth Regulation 1959, 1961, 233-45, figs.7,tabs.1,bibl.9.

Differences are described between susceptible and resistant species in the time course of uptake of 2,4-D by the roots of intact seedlings and by excised stem segments. In general, the susceptible species showed an initial phase of uptake, followed by a net loss of 2,4-D from the tissues. Resistant species, however, continued to accumulate 2,4-D throughout the experimental period, though there may have been an intervening phase when uptake slowed or ceased. Differences in the sensitivity of 2,4-D uptake to competitive inhibition by phenoxyacetic acid also pointed to specific differences in the mechanism controlling uptake. - C.C.McC. [O.W.]

1487. WEDDING, R.T. and BLACK, M.K. (Dep.Plant Biochem.,Univ.of California,U.S.A.). Uncoupling of phosphorylation in Chlorella by 2,4-dichlorophenoxyacetic acid. Plant and Soil, 1961, 14,(3),242-8, figs.2,tabs.2, bibl.5.

2,4-D inhibits the incorporation of $^{32}PO_4$ into adenosine triphosphate and adenosine diphosphate by Chlorella to a much greater extent than it inhibits the accumulation of inorganic phosphate. Comparison of the effect of 2,4-D on incorporation of ^{32}P into nucleotide-P with those of 2,4-dinitrophenol (DNP) showed that when supplied as equal concentrations of undissociated acid molecules, they were nearly equally effective. Both 2,4-D and DNP in concentrations which inhibited the incorporating of ^{32}P into nucleotides stimulated the uptake of oxygen by Chlorella thus supporting the suggestion that they are effectively uncoupling phosphorylation. From Authors' summary. J.W.F. [O.RE.]

1488. SIEGEL, S.M. and PORTO, F. (Carbide and Carbon Chem.Co.,Union Carbide and Carbon Corp.,30 East 42nd Street, New York, 17,,U.S.A.). Oxidants, antioxidants and growth regulation. Proc.4th internat.Conf.Plant Growth Regulation 1959, 1961, 341-53, tabs.4,bibl.30.

It is suggested that the antioxidant properties of growth hormones may be an important aspect of their biochemical function. It is shown that many other anti-oxidants can promote extension growth. C.C.McC. [O.W.]

1489. WEDDING, R.T. and BLACK, M.K. (Univ.California,Riverside,California, U.S.A.). The response of oxidation and coupled phosphorylation in plant mitochondria to 2,4-dichlorophenoxyacetic acid. Plant Physiol.,(Suppl.), 1961, 36,xxxix, (Abstract). [O.W.]

1490. GOWING, D.P. (Pineapple Res.Inst., Hawaii). Some comments on growth regulators with a potential in agriculture. Proc.4th internat.Conf.Plant Growth Regulation 1959, 1961, 803-9, figs.4,tabs.1,bibl.6.

Emphasizes that amongst the large number of substituted aryloxyalkyl carboxylic acids and other growth regulators there are compounds with very varied combinations of effects on plants. Particular compounds may be especially suited to the requirements of particular situations in agriculture, but their usefulness must be assessed by practical trial, since simple tests of growth-regulating activity do no reveal their full potential. This is illustrated by reference to research on pineapple growing. - C.C.McC. [O.W.]

1491. CRAFTS, A.S. (Univ.of California, Davis,U.S.A.). Improvement of growth regulator formulation. Proc.4th internat. Conf.Plant Growth Regulation 1959, 1961, 789-802, figs.9,tabs.3,bibl.14.

A review is given of the factors influencing the effectiveness of formulations of growth-regulating substances. Acid buffering, known to increase the penetration of dinitro compounds and PCP, was shown also to increase the penetration of 2,4-D. Dissociation was depressed and lipoid solubility increased at pH 3.3. Increasing the pH to 7.0 in the phloem

caused complete dissociation of 2,4-D, a diffusion gradient was set up and uptake increased. Growth regulators which enter the leaf by an aqueous route through the pores visible with the electron microscope, can penetrate either when the pores are saturated or when the solution contains surfactants which can pass round air bubbles in the microcapillories. Apoplastic movement of amitrole along mesophyll cell walls and symplastic movement of 2,4-D by diffusion through and streaming of the protoplasm, was demonstrated in beans. In potato tuber slices, movement of 2,4-D, IAA, amitrole and MH was symplastic while that of monuron was apoplastic. A saturated atmosphere, known to increase the uptake of MH, was shown to increase the uptake of amitrole, urea and 2,4-D in cotton, as a result of increased phloem movement and a temporary reversal of the transpiration stream. MH and amitrole, applied on leaves of Zebrina pendula and barley, moved throughout the phloem of the stem and root. MH was transferred to the xylem and entered transpiring leaves. 2,4-D moved only a few cm out of the leaf. Time (hours) taken by various growth substances to reach the tops of barley plants were: simazine and monuron 2, amitrole and phosphate 4, dalapon, IAA and MH 8, 2,4-D 2 days and urea, or some compound to which its ^{14}C has been transferred, 8 days. The effect of surfactants, humectants, oils and NH_4SCN_3 on penetration of herbicides are discussed briefly. M.G.G. [O.W.]

1492. FOY, C.L. (Bot.Dep.,Univ. California,Davis,U.S.A.). Absorption, distribution, and metabolism of 2,2-dichloropropionic acid in relation to phytotoxicity. 1. Penetration and translocation of Cl^{36}- and C^{14}-labeled dalapon. Plant Physiol., 1961, 36,(5),688-97, figs.1,tabs.6,bibl.34.

The results are given of field, glasshouse and laboratory experiments during 1953-8, in which radioactive dalapon was applied to sorghum (Double Dwarf Yellow Milo 38) and cotton (Acala 4-42), representative of susceptible monocotyledonous and tolerant dicotyledonous species, respectively. The results indicated that dalapon entered and moved readily through the leaves and roots of both species. Some foliar sorption (primarily cuticular) occurred almost immediately in both species. Acute toxicity at the point of foliar application (whether due to excess H ions, herbicide or toxic surfactant) reduced or prevented systemic distribution of dalapon. In the absence of acute toxicity, absorption and movement out of the region of application were protracted for 2 weeks, or longer.

Transport occurred readily via the transpiration stream, in the phloem (associated and apparently dependent on photosynthate movement), and laterally in phloem-xylem interchange. In both species, re-translocation and accumulation occurred in response to shifts in loci of high metabolic activity. Some leakage of dalapon occurred from the roots, especially in cotton. Despite its mobility, some dalapon was retained in transport. Restriction of dalapon movement was especially noticeable in the basal sections (intercalary meristem regions) of young sorghum leaves. Probable factors here were accumulation by living cells and weak adsorption on colloidal surfaces.

Neither penetrability nor metabolic inactivation appeared to play a major role in determining species specificity in the action of dalapon in cotton and sorghum. The penetration and translocation of dalapon were quantitatively influenced by numerous factors and the key to the selective growth-regulating activity of dalapon appeared to reside in the protoplasm. From Author's summary. - P.J.B. [O.W.]

1493. FOY, C.L. (Bot.Dep.,Univ.California, Davis,U.S.A.). Absorption, distribution, and metabolism of 2,2-dichloropropionic acid in relation to phytotoxicity. 2. Distribution and metabolic fate of dalapon in plants. Plant Physiol., 1961, 36,(5),698-709, figs.4, tabs.1,bibl.33.

In the experiments reported, cotton, sorghums and wheat were used as test species in studies of the distribution and fate of radioactive dalapon in relation to phytotoxicity. Pure ^{36}Cl-labelled dalapon held in aqueous stock solution in a refrigerator for several months was metabolized by microorganisms (possibly Alternaria sp.), producing 5 new ^{36}C-labelled substances, two of which were tentatively identified as inorganic ^{36}Cl and monochloropropionate-^{36}Cl.

Dalapon was absorbed, translocated, redistributed and accumulated in higher plants principally as the intact molecule, or dissociable salt thereof, and remained essentially unchanged for long periods, especially in dormant or quiescent tissues. At 7 days after foliar treatment of cotton and sorghum, dalapon, but no other prominent radioactive substance, was recoverable with water or ethanol from all plant parts and from the nutrient solutions in which the

plants were grown. At 10 weeks after treatment (via severed petioles), ca. 85-90% of the radioactivity was recoverable as dalapon from cotton fruits of different ages. Some slow metabolic decomposition resulted in the release of ^{36}Cl (from dalapon-^{36}Cl) or the incorporation of ^{14}C (from dalapon-2-^{14}C) into other compounds. Eventual breakdown possibly involves an initial dehalogenation, followed by normal or modified propionate oxidation.

Dalapon at rates as low as 4 # as a presowing treatment in winter severely inhibited growth of wheat. This growth inhibition was carried over to the first and second generation of plants grown from seed harvested from the treated plants. This carry-over effect was presumed to be due principally to nonmetabolized dalapon.

Two physiologically distinct types of action of dalapon were confirmed. They were: (a) acute toxicity and (b) delayed growth-regulatory response; (a) was believed to be due to the effect of dalapon as a fairly strong acid and protein precipitant, and (b) to low concentrations of dalapon in meristematic tissues. Neither penetrability nor ability to translocate and inactivate metabolically appeared to be primarily responsible for the specific herbicidal effects in different plant species.

The results of these studies were not considered to be at variance with the hypothesis that dalapon inhibits pantothenic acid synthesis and disturbs coenzyme A and pyruvate metabolism. From Author's summary. P.J.B. [O.W.]

1494. SCOTT, R.A. (Crops Res.Div.,Agric. Res.Serv.,U.S.Dep.Agric.,Beltsville,Maryland, U.S.A.). Mechanisms and reversal of gametocide response in cotton. Plant Physiol., 1961, 36,(5),529-38, figs.7,tabs.3,bibl.18.

In experiments in which the leaves of cotton plants were treated with dalapon and FW-450 (2,3-dichloroisobutyric acid), dark-conditioning to induce carbohydrate deficiency increased the non-dehiscent anther response. Applications of d-ribose or pantothenic acid to the leaves of plants treated with dalapon or FW-450 reversed the non-dehiscent response. Dark-conditioning inhibited the upward movement of ^{14}C-labelled FW-450. This inhibition was decreased by treatment with d-ribose; pantothenic acid, ± d-ribose enhanced the translocation of FW-450 to the reproductive parts of the plants. Application of radioactive dalapon or FW-450 to the basal leaves resulted in more complete distribution throughout the plants than application to the apex leaf. These results were considered to be in agreement with the hypothesis that the two gametocides used compete with pantoate in the plants, thus resulting in a diminution in the amount of pantothenic acid for coenzyme A synthesis. D-ribose is also a precursor of coenzyme A. - P.J.B. [O.W.]

1495. MUIR, R.M. and HANSCH, C. (Univ. Iowa,Ames,U.S.A.). Chemical structure and growth-activity of substituted benzoic acids. Proc.4th internat.Conf.Plant Growth Regulation 1959, 1961, 249-56, figs.2, tabs.3,bibl.12.

It is concluded that the growth activity of substituted benzoic acids in *Avena coleoptile* cylinder tests appear to be dependent primarily upon electronic characteristics determined by the substituents, but these electronic characteristics may be counteracted in part by steric factors. - C.C.McC. [O.W.]

1496. WOLF, F.T. (Vanderbilt Univ., Nashville,Tennessee,U.S.A.). Mechanism of action of 3-amino-1.2.4-triazole. Plant Physiol.,(Suppl.), 1961, 36,xxxix-xl, (Abstract).

Growth of *Chlorella pyrenoidosa* in Bristol's solution at 25°C under continuous illumination in 5% CO_2 was inhibited ca. 50% by 0.5 mg amitrole per 100 ml. Complete reversal of this growth inhibition could be induced by adding 1 mg of adenine, guanine, hypoxanthene, xanthene or (nearly completely) uric acid per 100 ml. With riboflavin, no reversal of growth inhibition was obtained. Amitrole at 10^{-4} M induced moderate growth inhibition in wheat seedlings and pronounced inhibition of chlorophyll synthesis. Neither type of inhibition could be reversed by equimolar concentrations of adenine, guanine, hypoxanthene, xanthene, folic acid, xanthopterin or histidine. Equimolar concentrations of riboflavin, FMN or FAD restored both normal growth and chlorophyll synthesis to nearly normal levels. These effects were virtually the same in tomato plants. It was concluded that amitrole affects a system in *Chlorella* different to that in wheat or tomato plants. P.J.B. [O.W.]

1497. MASSINI, P. (Philips Research Labs, Eindhover,Holland). Translocation of 3-amino-1.2.4-triazole in plants. 2. Inhibition study. Acta Bot.Veer, 1961, 10,99-104, figs.1,tabs.3,bibl.8.

In studies using tomato and bean plants, the translocation of amitrole from treated

leaves was strongly dependant on the presence of light and was inhibited by HCN in the atmosphere surrounding the plants. Attempts to replace the effect of light by painting the leaves with sucrose solutions were unsuccessful. The transport of amitrole taken up by the translocation stream was not inhibited by HCN. Concentrations of HCN high enough to block translocation also inhibited the respiration of stem sections. In bean plants, translocation of amitrole from leaves to the plant tops required the presence of living tissue and was presumed to take place in the sieve tubes, whereas amitrole taken up by the translocation stream passed through the xylem tubes by a mechanism independent of living tissue. - J.L.M. [213(492)]

1498. JACOBSON, A.B. and ROGERS, B.J. (Univ.Chicago,Illinois,U.S.A.) Observations concerning the amino triazole effect on maize chloroplasts, using the electron microscope. Plant Physiol. (Suppl.),1961,36,xl.(Abstract).
In studies to determine whether the chlorosis in newly-formed maize leaves as a result of treatment with amitrole was due to structural defects in the chloroplasts, large differences between treated and untreated plants in internal chloroplast structure were observed. Typical differences between the chloroplasts of the vascular sheath and adjacent mesophyll were not apparent in the effected portion of leaves. - P.J.B. [O.W.]

1499. FOY, C.L. (Univ.California,Davis, U.S.A.). Detoxification of radioactive 2-chloro-4,6-alkylamine triazines by Sorghum vulgare. Plant Physiol.,(Suppl.),1961, 36,xl-xli,(Abstract).
In experiments in which Sorghum vulgare and Avena sp. were grown in soil containing different concentrations of propazine-^{14}C, both species absorbed and translocated the herbicide equally well initially. After 1-2 months, S. vulgare was normal in growth and the shoots contained a maximum of 3.6 p.p.m. propazine, on a dry-matter basis; oat plants, on the other hand, contained 12.2 p.p.m. propazine and were all dead. In S. vulgare, ^{14}C became distributed throughout all plant tissues at maturity, but the level of non-metabolized propazine remained low at all times. It was concluded that systems in Zea mays and S. vulgare concerned with triazine breakdown are similar. - P.J.B. [O.W.]

1500. ASHTON, F.M. and FU, M.H. (Univ. California,Davis,California,U.S.A.). Effect of ethyl N,N-di-n-propylthiolcarbamate on respiration and photosynthesis. Plant Physiol.,(Suppl.), 1961, 36,xli,(Abstract).
The oxygen uptake of excised embryos of mung bean [Phaseolus sp.] cultured for 24 hours in darkness at 30°C in solutions containing 0, 10 and 100 p.p.m. EPTC was 26.2,33.4 and 45.2 µl/hour/100 mg fresh weight, respectively. The fresh weight of the embryos was reduced by the EPTC. The fixation of $^{14}CO_2$ by excised leaves of 10-day-old kidney beans grown in sand culture in solutions containing 0, 1, 10 and 100 p.p.m. EPTC for 5, 10, 50 or 100 hours was inhibited by all concentrations of EPTC after 100 hours exposure and by 100 p.p.m. EPTC after exposure for 50 hours. Shorter exposure times did not inhibit $^{14}CO_2$ fixation. Although exposure to EPTC for 100 hours inhibited $^{14}CO_2$ fixation, it did not alter the distribution of ^{14}C in the various labelled compounds. - P.J.B. [O.W.]

1501. TEUBNER, F.G., WITTWER, S.H. and SHEN, J.Y. (Michigan State Univ.East Lansing,U.S.A.). Relationship of molecular structure to biological activity in the N-aryl phthalamic acids. Proc.4th internat. Conf.Plant Growth Regulation 1959, 1961, 259-71, tabs.3,bibl.36.
Data are given for the effects on tomato flower formation, parthenocarpic development of tomato ovaries and straight growth of Avena coleoptile sections of 20 chloro- and methyl - derivatives of N-phenylphthalamic acid. Modifications in molecular structure had almost identical effects on activity in all three biological responses. Some of the substitutive effects suggested similarity to either the benzoic, phenylacetic or phenoxyacetic acids, but others showed distinct differences. - C.C.McC. [O.W.]

1502. TINLEY, G.H. (The Rubber Res.Inst., Kuala Lumpur,Malaya). Effect of ferric dimethyldithiocarbamate on the rooting of cuttings of Hevea brasiliensis. Nature, Lond., 1961, 191,(4794),1217-18, figs.2,tabs.1, bibl.5.
A note is given on the stimulation of root initiation caused by the use of ferric dimethyldithiocarbamate and other related dithiocarbamates as fungicides to protect the base of cuttings of Hevea brasiliensis. This stimulation could not be completely explained by the fungicidal action of these compounds. - P.J.B. [O.W.]

1503. TOLBERT, N.E. (Michigan State Univ., East Lansing, U.S.A.). (2-Chloroethyl) trimethylammonium chloride and related compounds as plant growth substances. Proc. 4th internat. Conf. Plant Growth Regulation 1959, 1961, 779-86, figs.1, tabs.1, bibl.6.

In a general discussion of these choline analogues, it is shown that compounds of the structure $(CH_3)_3N^+CH_2-CH_2X$ affect plant growth when X is Cl, Br, or = CH_2. These substances are active at 10^{-6} M when poured on soil, and cause wheat plants to grow with shorter and thicker stems and greener leaves than control plants. These growth changes resembled those produced by high light intensity and were the opposite of those caused by gibberellin. The opposite types of growth induced by gibberellin and by the title compound (as bromide) counteracted each other on the same plant. From Author's summary. - C.C.McC. [O.W.]

1504. LeFEVRE, C.W. and CLAGETT, C.O. (Pennsylvania State Univ., University Park, U.S.A.). Further studies on the growth inhibitor from quackgrass. Plant Physiol., (Suppl.), 1961, 36, ix, (Abstract).

Using paper chromatography, ion exchange and silica gel chromatographic techniques, several fractions which showed plant-growth inhibiting effects were isolated from extracts of Agropyron repens. The presence of an acidic component, which was relatively unstable in acidic and basic solutions, was indicated. This component was not aromatic, appeared to be of relatively low molecular weight, it contained a carbonyl group and was probably carbohydrate in nature. - P.J.B. [O.W.]

1505. MUZIK, T.J. and WHITWORTH, J.W. (Washington State Univ., Pullman, U.S.A.). A biological method for determing persistence of chemicals in plant tissues. Plant Physiol. (Suppl.), 1960, 35, xxvi, (Abstract).

One of the problems in measuring the persistence of chemicals in plants is the continued abnormal activity of the meristem long after the chemical has disappeared from the plant. Also, there may be later development of dormant buds which had been injured before becoming dormant. A method is described to overcome these difficulties. Basically, the method involves the introduction of meristems from untreated plants into the treated plant by grafting. Tomato plants were used in most of this work, although other species are under test. The plants were treated by dipping one leaf into 1000 p.p.m. 2,4-D acid solution. The treated leaf was excised after 8 days. Buds from untreated tomato plants were grafted on the treated plants at the second node above the excised leaf. Grafting was done at intervals of 8, 12, 23, 32, 40, 61 and 90 days after treatment. The new growth from buds grafted up to 2 months after treatment showed definite 2,4-D symptoms. Graft unions and scion growth were poor after this time. There were indications that the 2,4-D may have persisted for at least 90 days. The method should be applicable to a number of chemicals and species. Authors' abstract. [O.W.]

1506. PALMER, R.D. (Mississippi Agric. Exp. Sta., State College, U.S.A.). Cytochrome C oxidase in the tuber of nutsedge (Cyperus rotundus). Weeds, 1961, 9, (3), 364-8, figs.1, tabs.1, bibl.9.

Cytochrome C oxidase was shown to operate in dormant and germinated C. rotundus tubers. A CO/O_2 ratio of 19:1 showed inhibition of oxygen uptake by nutsedge tissue slices of 41% as compared to values obtained in a control atmosphere of nitrogen and oxygen (N_2/O_2 = 19). This inhibition was photo-reversible. The addition of cytochrome C to tuber slices resulted in a stimulation of 24% of oxygen consumption, which was demonstrated to be photo-reversibly inhibited by carbon monoxide.

The activity of cytochrome C oxidase increased during germination of the tuber. Author's summary. [O.W.]

MISCELLANEOUS

1507. CANADA, DEPARTMENT OF AGRICULTURE, RESEARCH BRANCH. Herbicides. Res.Rep. Pesticide Res.Inst., 1957-60, 1961, 23-7.

Reviews briefly the results of research carried out by the Pesticide Research Institute, Ontario on the following subjects: (a) effects of insecticides and herbicides on 3 plant diseases (Helminthosporium sativum, Alternaria solani and Fusarium oxysporum f. lycopersici), (b) metabolism of indoleacetic acid, (c) photosynthesis and herbicidal action, (d) mode of action of monuron and related compounds, (e) mode of action of herbicidal oils, (f) MH, (g) the uptake of pesticides by plant roots, (h) the metabolism of 2,4-D by a new species of Achromobacter. - J.L.M. [253(71)]

1508. MONTGOMERY, D. (Borax Consolidated, Ltd., London, England). Methods of using non-selective herbicides. Pest Technol., 1961, 3, (11), 249-51, figs.1.
A review is given of practical considerations in the use of different herbicides for non-selective purposes, with particular reference to granular formulations.
P.J.B. [O.W.]

1509. WEEDS. Report of the Terminology Committee, Weed Society of America. Weeds, 1960, 8, (3), 487-521, tabs.4.
Includes a list of herbicide common names approved by the Weed Society of America, a list of abbreviations of terms used in weed control, and lists of herbaceous weeds arranged under both the common and scientific names. - D.M.L.S. [O.W.]

1510. BOURON, H. L'homologation des produits antiparasitaires a usage agricole. [Approval of agricultural pesticides.] Phytoma, 1959, 105, 31-5.
Gives the text of the French Ministry of Agriculture's two circulars of 24 December 1958 setting out the different categories of pesticides and the regulations governing the official approval scheme. - D.M.L.S. [L.EB.]

1511. PICKETT, C.I. (Farm Bureau Fed. Mass., U.S.A.). Dangers are foreseen in pesticide-use regulations. Agric.Chem., 1961, 16, (8), 20-1, 75.
Strong criticism is made of a proposal to legislate in Massachusetts for some form of license-permit system, to be administered by a State Control Commission, for use of pesticides. - D.M.L.S. [O.W.]

1512. EPPS, E.A. (Louisiana Dep.Agric. U.S.A.). Legal problems connected with widespread application of chemicals. Proc.9th Annu.For.Symp. 1960, 1961, 101-10.
Potential sources of danger from the use of herbicides and pesticides are reviewed and the importance of the prompt investigation of claims and legal responsibility are discussed. - P.J.B. [O.W.]

1513. ENNIS, W.B. (Crops Res.Div., Agric.Res.Serv., U.S.Dep.Agric., Beltsville, Maryland, U.S.A.). Progress and potential in weed investigations. Proc.14th Southern Weed Conf., 1961, 21-8.
Figures, among others, are given for the estimated acreage treated and total costs of pre- and post-em. herbicidal treatment of different crops in the U.S.A. in 1959.
P.J.B. [O.W.]

1514. BRADFORD, M. Crop spraying simplified. Blackwell Scientific Publications, 1961, pp.113, 9s.6d.
A practical handbook giving information on the principal weedkillers (with commercial trade names) and their use in general and specific crops. Useful data include compatibility tables for the products of 5 of the leading British herbicide manufacturers, the amounts of active acid per pint in several British commercial products and machine settings for delivering 10, 15, 20 and 30 gal/ac for various British commercial sprayers. Notes on some of the commoner British weeds are also included. Only very brief space is given to insecticides and fungicides. - D.M.L.S. [W35(42)]

1515. HAMMARLUND, A. (Statens Ukrudtsforsøg, Skorlunde, Denmark). Erfaringer om virkningen af Kemiske ukrudtsmidler i praksis i 1960. [Experiences of the effect of chemical weedkillers in practice in 1960.] Dansk Landbr., 1960, 79, (11) 337-8.
A summary is given of the answers given by 138 farmers in Denmark to a questionnaire on their experiences with herbicides in the 1960 season (very dry spring). Of the 138 replies, 60 declared satisfaction with results obtained, 8 were dissatisfied and the remainder had reservations. In this season, thistles were a serious problem in spring-sown cereals in many cases. - P.J.B. [G.R.I.]

1516. SVEINSON, O. (Statens Plantevern, Oslo, Norway). Blir korn og ugras frø drept ved halmluting? [Are grain and weed seeds killed by lye-treatment of straw?] Norsk Landbr., 1960, 78, (1), 10-11.
The results of trials in 1944 indicated that steeping the seed of 15 weed species for 16 hours in a 1.33% solution of lye (caustic soda) completely killed that of Galeopsis speciosa and Stachys palustris and severely injured that of Deschampsia caespitosa, Stellaria media and Thlaspi arvense. After steeping for 48 hours in 1.33% solution or for 16 hours in 2.66% solution, only the seed of Sonchus arvensis and (to a lesser extent), that of Chenopodium album, survived. In more recent laboratory trials, the seed of wild oats (Avena fatua)

was killed by steeping for 8 hours in 1% lye solution. - P.J.B. [G.R.I.]

1517. McDERMID, R.W. [Editor]. The use of chemicals in Southern Forests. 9th Annu.For. Symp. 1960, 1961, pp.152. The Louisiana State University Press, $4.

The 9th Forestry Symposium was held at Louisiana State University. Its programme was divided into 3 parts, the first dealing with forest fertilization, the second with the use of herbicides in Southern forests and the third with the use of chemicals for protecting forests against fire, fungi and insects. Of interest to weed research workers is the second section, which contained 4 papers which are abstracted elsewhere in the present number of Weed Abstracts.
P.J.B. [O.W.]

List of common names and abbreviations used for herbicides in Weed Abstracts

An asterisk (*) signifies approval by the British Standards Institution (BSI)
A plus sign (+) signifies approval by the Weed Society of America (WSA)
Where the name approved by the WSA differs from that approved by the BSI, the WSA name is given in brackets after the chemical name.

amiben +	3-amino-2,5-dichlorobenzoic acid
ametryne *	2-methylmercapto-4-ethylamino-6-isopropylamino-1,3,5-triazine
amitrole +	3-amino-1,2,4-triazole
AMS +	ammonium sulphamate
atrazine *+	2-chloro-4-isopropylamino-6-ethylamino-1,3,5-triazine
barban *+	4-chloro-2-butynyl-N-(3-chlorophenyl)carbamate
BiPC	butinol-N-(3-chlorophenyl)carbamate
CDAA +	2-chloro-NN-diallylacetamide
CDEA +	2-chloro-NN-diethylacetamide
CDEC +	2-chloroallyl-NN-diethyldithiocarbamate
chlorpropham *	isopropyl-N-(3-chlorophenyl)carbamate - (CIPC)
4-CPA *+	4-chlorophenoxyacetic acid
4-CPB	4-(4-chlorophenoxy)butyric acid
2,4-D *+	2,4-dichlorophenoxyacetic acid
dalapon *+	2,2-dichloropropionic acid
2,4-DB	4-(2,4-dichlorophenoxy)butyric acid - (4-(2,4-DB))
DCU +	dichloralurea
2,4-DEB +	2,4-dichlorophenoxyethyl benzoate
2,4-DEP +	tris-(2,4-dichlorophenoxyethyl)phosphite
2,4-DES *	2,4-dichlorophenoxyethyl hydrogen sulphate - (sesone)
di-allate *	2,3-dichloroallyl diisopropylthiolcarbamate
dichlone *+	2,3-dichloro-1,4-naphthoquinone
dichlorprop *	2-(2,4-dichlorophenoxy)propionic acid - (2-(2,4-DP))
dinosam *	2-s-amyl-4,6-dinitrophenol - (DNAP)
dinoseb *	2-s-butyl-4,6-dinitrophenol - (DNBP)
diquat *+	1,1'-ethylene-2,2'-bipyridylium-2A
diuron *+	N-(3,4-dichlorophenyl)-N'N'-dimethylurea
DMTT +	3,5-dimethyltetrahydro-1,3,5,2H-thiadiazine-2-thione
DNOC	2-methyl-4,6-dinitrophenol or 3,5-dinitro-o-cresol - (DNC)
endothal *+	3,6-endoxohexahydrophthalic acid
EPTC +	ethyl-NN-dipropylthiolcarbamate
erbon	2-(2,4,5-trichlorophenoxy)ethyl-2'2'-dichloropropionate
fenac +	2,3,6-trichlorophenylacetic acid
fenoprop *	2-(2,4,5-trichlorophenoxy)propionic acid - (silvex)
fenuron *+	N-phenyl-N'N'-dimethylurea
ipazine *+	2-chloro-4-diethylamino-6-isopropylamino-1,3,5-triazine
MCPA *+	4-chloro-2-methylphenoxyacetic acid
MCPB *	4-(4-chloro-2-methylphenoxy)butyric acid - (4-(MCPB))
mecoprop *	dl 2-(4-chloro-2-methylphenoxy)propionic acid - (2-(MCPP))
MH +	maleic hydrazide
monuron *+	N-(4-chlorophenyl)-N'N'-dimethylurea
neburon +	N-(3,4-dichlorophenyl)-N'-butyl-N'methylurea
naptalam *	N-1-naphthylphthalamic acid - (NPA)
OMU	N-cyclooctyl-N'N'-dimethylurea
paraquat *	1,1'-dimethyl-4,4'-bipyridylium-2A
PCP +	pentachlorophenol
prometon *	2-methoxy-4,6-bis(isopropylamino)-1,3,5-triazine
propazine *+	2-chloro-4,6-bis(isopropylamino)-1,3,5-triazine
propham *	isopropyl-N-phenylcarbamate - (IPC)
simeton *	2-methoxy-4,6-bis(ethylamino)-1,3,5-triazine
simazine *+	2-chloro-4,6-bis(ethylamino)-1,3,5-triazine
simetryne *	2-methylmercapto-4,6-bis(ethylamino)-1,3,5-triazine
SMDC +	sodium methyl dithiocarbamate
2,4,5-T *+	2,4,5-trichlorophenoxyacetic acid
2,4,5-TB	4-(2,4,5-trichlorophenoxy)butyric acid - (4-(2,4,5-TB))
2,3,6-TBA +	2,3,6-trichlorobenzoic acid
TCA +	trichloroacetic acid
2,4,5-TES +	sodium 2,4,5-trichlorophenoxyethyl sulphate
trietazine *+	2-chloro-4-diethylamino-6-ethylamino-1,3,5-triazine

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